

# Absolute magnitudes of asteroids and a revision of asteroid albedo estimates from WISE thermal observations

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## Abstract

We obtained estimates of the Johnson  $V$  absolute magnitudes ( $H$ ) and slope parameters ( $G$ ) for 583 main-belt and near-Earth asteroids observed at Ondřejov and Table Mountain Observatory from 1978 to 2011. Uncertainties of the absolute magnitudes in our sample are  $< 0.21$  mag, with the median value of 0.09 mag. We compared the  $H$  data with absolute magnitude values given in the MPCORB, Pisa AstDyS and JPL Horizons orbit catalogs. We found that while the catalog absolute magnitudes for large asteroids are relatively good on average, showing only little biases smaller than 0.1 mag, there is a systematic offset of the catalog values for smaller asteroids that becomes prominent in a range of  $H$  greater than  $\sim 10$  and is particularly big above  $H \sim 12$ . The mean ( $H_{\text{catalog}} - H$ ) value is negative, i.e., the catalog  $H$  values are systematically too bright. This systematic negative offset of the catalog values reaches a maximum around  $H = 14$  where the mean ( $H_{\text{catalog}} - H$ ) is  $-0.4$  to  $-0.5$ . We found also certain correlations of the offset of the catalog  $H$  values with taxonomic types and with lightcurve amplitudes. We discuss a few possible observational causes for the observed correlations, but a major reason for the huge bias of the catalog absolute magnitudes peaking around  $H = 14$  is unknown; we suspect that a main problem lies in the magnitude estimates reported by asteroid surveys. With our photometric  $H$  and  $G$  data, we revised the preliminary WISE albedo estimates made by Masiero et al. (Astrophys. J. 741, 68–89, 2011) and Mainzer et al. (Astrophys. J. 743, 156–172, 2011) for asteroids in our sample. We found that the mean geometric albedo of Tholen/Bus/DeMeo C/G/B/F/P/D types with sizes of 25–300 km is  $p_V = 0.057$  with the standard deviation (dispersion) of the sample of 0.013 and the mean albedo of S/A/L types with sizes 0.6 to 200 km is 0.197 with the standard deviation of the sample of 0.051. The standard errors of the mean albedos are 0.002 and 0.006, respectively; systematic observational or modeling errors can predominate over the quoted formal errors. There is apparent only a small, marginally significant difference of  $0.031 \pm 0.011$  between the mean albedos of sub-samples of large and small (divided at diameter 25 km) S/A/L asteroids. The apparent small difference will have to be confirmed and explained; we speculate that it may be either a real size dependence of surface properties of the differentiated asteroid types or due to small size-dependent systematic effects in their observations or thermal models. A trend of the mean of the preliminary WISE albedo estimates increasing with decreasing asteroid size below  $D \sim 30$  km showed in Mainzer et al. (Astrophys. J. 741, 90–114, 2011) was explained as being due to the systematic bias in the MPCORB absolute magnitudes.

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## 1 Introduction

Diameters and albedos of asteroids are their basic physical parameters. Asteroid diameters can be estimated with several direct or indirect techniques. Direct size estimation techniques include in-situ spacecraft observations, resolved imaging with adaptive optics systems or radar observations, and asteroid occultations of stars. An efficient use of the direct techniques is, however, limited to mostly large asteroids or those making close approach. Among indirect techniques of asteroid size estimation that can be applied to a large sample of asteroids covering a broad range of sizes, the most powerful is a technique of asteroid thermal modeling with observations of their thermal infrared and visual fluxes; the effective diameter and visual geometric albedo are parameters of asteroid thermal models.

Ideally, both the integral thermally emitted infrared and the integral reflected optical fluxes should be measured simultaneously. In practice, however, thermal observations are normally made at a single or over a limited range of aspects, and it has become a normal practice for asteroid thermal modellers to estimate the integral optical flux from the asteroid's absolute visual magnitude  $H$  and modeling its phase function. The absolute magnitude of a Solar System object is defined as the apparent magnitude of the object illuminated by the solar light flux at 1 AU and observed from the distance of 1 AU and at zero phase angle.

Absolute magnitudes of asteroids are estimated from their photometric observations. As the observations are generally taken at non-zero solar phase angles, an estimation of  $H$  involves an estimation of a dependence of the asteroid brightness on the phase angle. The dependence is most often modeled with the  $H$ - $G$  phase relation (Bowell et al., 1989) that has conveniently only two free parameters, the absolute magnitude  $H$  and the slope parameter  $G$ . A systematic model error of the  $H$ - $G$  phase relation is on an order of a few 0.01 mag (Harris, 1989).

Recent thermal infrared survey observations by the *Wide-field Infrared Survey Explorer (WISE)*, AKARI and the *Spitzer Space Telescope* resulted in estimating diameters and albedos for thousands of asteroids (e.g., Mainzer et al., 2011a,b; Masiero et al., 2011; Usui et al., 2011; Ryan and Woodward, 2011). They used the absolute magnitude values from the asteroid orbit catalogs MPCORB<sup>1</sup> or AstOrb.<sup>2</sup> Most of the absolute magnitudes in the catalogs were derived from magnitude estimates reported by visual asteroid surveys and follow-up observers with their astrometric observations. The procedures that most of the astrometric surveys, follow-up observers, and orbit calculators used for estimating the asteroid apparent magnitudes and derivation of the  $H$  values have not been comprehensively published so far.

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<sup>1</sup> <http://www.minorplanetcenter.org/iau/MPCORB.html>.

<sup>2</sup> <ftp://ftp.lowell.edu/pub/elgb/astorb.html>.

Given the principal importance of asteroid absolute magnitudes data for the estimation of their diameters and albedos and considering that an accuracy of and biases present in the  $H$  values in the orbit catalogs have not been satisfactorily characterized so far,<sup>3</sup> we investigated them by comparing the catalog  $H$  values with our absolute magnitude estimates for a sample of 583 main-belt and near-Earth asteroids that we observed photometrically within our asteroid lightcurve observations projects over the past 33 years.

## 2 Absolute magnitudes $H$ data sample

Our sample consists of absolute magnitude estimates that we derived from our photometric observations of asteroids that we made from Ondřejov Observatory, Czech Republic, and Table Mountain Observatory, California, from 1978 to 2011. The observations were made within our projects aimed at estimation of spins, shapes, and binary nature of asteroids in the main belt and on inner-planet crossing orbits. About a half of the  $H$  data in our sample we published in a series of papers (see their list below Table 2). A part of the  $H$  estimates is new data that we derived more recently. Most of the observations of asteroids in our sample were targeted observations — the asteroids were selected and observed deliberately for particular aims of the specific photometric projects. A fraction (96 of the 583) were, however, accidental observations of asteroids that happened to be present in the imaged fields of the targeted asteroids. We outline our observational and reduction procedures in following paragraphs.

### 2.1 Absolute calibrations in the Johnson-Cousins $BVRI$ system

We made the observations primarily through the V or R filters and calibrated them in the Johnson-Cousins system using the Landolt standard stars (Landolt, 1973, 1983, 1992). We observed some of the asteroids also in other than just the primary filter and in such cases we estimated their actual color indices. Many of the asteroids were, however, observed in only the primary filter, R in the case of the Ondřejov observations as with the CCD cameras we got a higher signal-to-noise ratio and a lower atmospheric extinction with observations in the R than in the V band. A spectral transmission curve of the R filter was designed for a given CCD so that the resulting spectral response of the telescope+filter+CCD combination matched closely the Cousins R passband as defined in Bessell (1990); the coefficient of the color term with  $(V - I)$  in

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<sup>3</sup> Actually, we had a suspicion that there is present a significant bias in the orbit catalog  $H$  data for many years already. We and other observers noticed that our photometric observations of asteroids smaller than about 20 km typically showed them being fainter than predicted using the catalog  $H$  values. Results from three earlier papers showing the offset by comparing the catalog magnitudes with data from the Sloan Digital Sky Survey are presented in Section 3.3.

the photometric transformation function of the telescope system was always within 0.05 of zero. With such filter+CCD setup, we were able to calibrate the asteroid photometric observations in the Cousins R system assuming  $(V - I)$  of 0.80, which is about the average asteroidal color index, with a systematic error  $< 0.01$  mag; note that the most common C and S asteroid types have the mean  $(V - I)$  of 0.73 and 0.90, respectively (Shevchenko and Lupishko, 1998).

## 2.2 Mean brightness level estimation

For derivation of the mean absolute magnitude  $H$  of an asteroid corresponding to its mean cross-section, we need to estimate its mean reduced magnitude that is the asteroid's apparent magnitude reduced to the unit geo- and helio-centric distances and to a normal phase angle that is close to the mid-range of solar phases covered by the observations. In most cases, we estimated the mean reduced magnitude as the zeroth order of the 1-period (or 2-period, for tumblers) Fourier series, or two additive 1-period Fourier series in the case of a binary asteroid where lightcurves of both the primary and the secondary components were observed, fitted to the photometric observations made over one or more nearby nights that covered the rotation lightcurve sufficiently (see the references below Table 2 for details of the technique). An uncertainty of the mean reduced magnitude estimated in these cases was mostly  $< 0.01$  mag. In a fraction of asteroids in our sample, mostly some long-period ones, where we did not obtain sufficient data to get an accurate Fourier series fit or where the rotation period has not been estimated with sufficient accuracy, we estimated the asteroid's mean brightness either as the mean value of a range in which the Fourier series zeroth order lie for a range of possible and plausible fits to the observations, or as an average of the observations made during one or more nearby nights in cases where even a range of possible Fourier series fits could not be obtained. In all the cases with limited or no Fourier fits available, we paid attention to that the resulted mean magnitude estimate had an uncertainty  $< 0.2$  mag. Even in cases with the least constrained lightcurves, we required an evidence that either the asteroid's total amplitude was small to moderate so that the mean level estimated as an average of the observations could not be off by more than 0.2 mag, or that the observations covered a sufficient range of rotational phases so that the average of the observations was close to the mean brightness level.

## 2.3 Reduction to zero phase angle

The absolute magnitude  $H$  is defined as the reduced magnitude at zero phase angle. The mean magnitudes observed at non-zero phase angles were reduced to zero phase using the  $H-G$  phase relation. For nearly half of our observed asteroids, we got sufficient data to estimate the slope parameter  $G$  from the

observations. For the rest, we assumed  $G$  based on their taxonomic classification where available and conclusive or on their orbital group membership. The assumed default  $G$  values were taken from Tables 2 and 3 of Warner et al. (2009) in most cases. For some  $H$  estimates that we published before (see the references in Table 2), we assumed slightly different default values of  $G$  based on earlier works, e.g.,  $0.23 \pm 0.11$  instead of the new default  $0.24 \pm 0.11$  for S types, or  $0.09 \pm 0.09$  instead of the new default  $0.12 \pm 0.08$  for C types; we kept those earlier estimates in such cases as the differences are minor and well within the uncertainties. The uncertainties of the assumed default  $G$  values were propagated to the estimated uncertainties of the resulted  $H$  values.

The uncertainties in the  $G$  values were the most significant source of uncertainty for the  $H$  estimates for many asteroids in our sample. As we aimed to get  $H$  values with uncertainties not greater than 0.2 mag, we limited our sample to include asteroids that were observed at solar phases not greater than  $\sim 30^\circ$ , which gave an uncertainty in resulting  $H$  of  $\pm 0.16$  and  $\pm 0.14$  for the default  $G$  of S and C types, respectively, with only a few exceptions in justified cases.

#### 2.4 Derivation of $H$ from $H_R$

Most of the Ondřejov observations were taken in the Cousins  $R$ . We transformed the estimated  $H_R$  values to  $H \equiv H_V$  by adding the mean color index ( $V - R$ ) for known or assumed (according to its orbital group membership) taxonomic class of a given asteroid. The mean color indices for the major classes S, C and M (X) in the taxonomic system of Tholen (1984, 1989) were taken from Shevchenko and Lupishko (1998). For other, smaller classes Q, A, D, Xc, Xe and V in the Bus–DeMeo taxonomy, we derived the mean color index from the mean reflectance spectrum of a given class provided by DeMeo et al. (2009), assuming solar  $(V - R) = 0.367$ . The mean  $(V - R)$  values are listed in Table 1. For three asteroids with an ambiguous classification of S or A, we assumed  $(V - R) = 0.528 \pm 0.05$  which is the average of the mean color indices for the two classes. For asteroids with unknown spectral class, we used the mean  $(V - R)$  for a class predominating in their respective orbital group according to Table 2 of Warner et al. (2009). We note that our  $(V - R)$  estimates derived from the mean spectra for the Bus–DeMeo classes are in agreement with the color indices for the analogous Tholen classes derived from the mean colors in the eight-color asteroid survey for their specific CCD and filter responses by Dandy et al. (2003) for all but the V class. The V-type broad-band color depends critically on the exact R passband as there is the deep pyroxene band in the far red, which may explain their different  $(V - R)$  estimate.

Table 1

Mean color indices ( $V - R$ ) used for conversion of  $H_R$  to  $H$ 

| Class | ( $V - R$ )       | Reference                                    |
|-------|-------------------|----------------------------------------------|
| S     | $0.49 \pm 0.05$   | Shevchenko and Lupishko (1998)               |
| Q     | $0.454 \pm 0.023$ | from mean Q spectrum by DeMeo et al. (2009)  |
| A     | $0.567 \pm 0.023$ | from mean A spectrum by DeMeo et al. (2009)  |
| C     | $0.38 \pm 0.05$   | Shevchenko and Lupishko (1998)               |
| D     | $0.455 \pm 0.033$ | from mean D spectrum by DeMeo et al. (2009)  |
| T     | $0.442 \pm 0.011$ | from mean T spectrum by DeMeo et al. (2009)  |
| X     | $0.42 \pm 0.04$   | Shevchenko and Lupishko (1998)               |
| Xc    | $0.408 \pm 0.008$ | from mean Xc spectrum by DeMeo et al. (2009) |
| Xe    | $0.453 \pm 0.037$ | from mean Xe spectrum by DeMeo et al. (2009) |
| V     | $0.516 \pm 0.037$ | from mean V spectrum by DeMeo et al. (2009)  |

### 2.5 Averaging $H$ estimates from different apparitions

For 38 of the 583 asteroids in our sample, we have got more than one  $H$  estimate, mostly from observations made in different apparitions. In all but one of the cases, we computed the mean  $H$  value as a weighted mean of the individual estimates, with weights of  $\delta H^{-2}$ . The exception was (1866) Sisyphus where the two  $H$  estimates differ by 0.38 mag that we suspect is due to different cross-sections at the two different aspects of the asteroid in the two apparitions rather than due to uncertainties of the  $H$  estimates; we used a simple average of the two values, i.e., assumed equal weights.

### 2.6 Uncertainties of the $H$ estimates

We estimated the uncertainties  $\delta H$  of our absolute magnitude estimates by propagating the uncertainties resulting from the individual error sources mentioned above. All the  $H$  estimates in our sample have  $\delta H < 0.21$  mag. They are realistic estimated uncertainties for the absolute magnitudes measured at the observed aspects of the asteroids. We note, however, that an asteroid generally has different  $H$  values at different aspects. A magnitude of the difference depends on a shape of the asteroid and its rotation pole position. Analysing the data for a sample of large asteroids by Drummond et al. (1988, 1991) who derived dependences of their  $H$  values on observing aspect, we estimated the median dispersion of the observed  $H$  values of 0.07 mag. The aspect/shape-related uncertainty must be considered or accounted for when the  $H$  value estimated from observations made at a specific aspect is used for



other observations made at a different aspect.

The estimated absolute magnitudes, their uncertainties, estimated or assumed slope parameter values and mean lightcurve amplitudes are listed in Table 2.

Table 2: H data

| Asteroid       | $H$   | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------------|-------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 3 Juno         | 5.280 | 0.040      | 0.320  | 0.040      | 5.33             | 0.32             | 5.37             | 0.32             | 5.33             | 0.32             | 0.050                | 0.090                | 0.050                | 0.15  | 2            |
| 8 Flora        | 6.560 | 0.110      | 0.320  | 0.110      | 6.49             | 0.28             | 6.56             | 0.28             | 6.49             | 0.28             | -0.070               | 0.000                | -0.070               | 0.08  | 1            |
| 9 Metis        | 6.330 | 0.120      | 0.230  | 0.110      | 6.30             | 0.15             | 6.25             | 0.17             | 6.28             | 0.17             | -0.030               | -0.080               | -0.050               | 0.20  | 1            |
| 11 Parthenope  | 6.570 | 0.030      | 0.240  | 0.030      | 6.55             | 0.15             | 6.57             | 0.15             | 6.55             | 0.15             | -0.020               | 0.000                | -0.020               | 0.05  | 3            |
| 12 Victoria    | 7.060 | 0.010      | 0.220  | 0.020      | 7.24             | 0.22             | 7.21             | 0.22             | 7.24             | 0.22             | 0.180                | 0.150                | 0.180                | 0.08  | 4            |
| 16 Psyche      | 5.930 | 0.060      | 0.210  | 0.060      | 5.90             | 0.20             | 6.02             | 0.20             | 5.90             | 0.20             | -0.030               | 0.090                | -0.030               | 0.21  | 4            |
| 17 Thetis      | 7.900 | 0.100      | 0.230  | 0.110      | 7.76             | 0.15             | 7.71             | 0.15             | 7.76             | 0.15             | -0.140               | -0.190               | -0.140               | 0.28  | 3            |
| 19 Fortuna     | 7.152 | 0.020      | 0.162  | 0.030      | 7.20             | 0.15             | 7.21             | 0.10             | 7.13             | 0.10             | 0.048                | 0.058                | -0.022               | 0.23  | 3, 4         |
| 24 Themis      | 7.088 | 0.008      | 0.180  | 0.020      | 7.20             | 0.15             | 7.21             | 0.19             | 7.08             | 0.19             | 0.112                | 0.122                | -0.008               | 0.09  | 2            |
| 30 Urania      | 7.530 | 0.020      | 0.230  | 0.000      | 7.60             | 0.15             | 7.59             | 0.15             | 7.53             | 0.15             | 0.070                | 0.060                | 0.000                | 0.11  | 12           |
| 31 Euphrosyne  | 6.700 | 0.040      | 0.090  | 0.090      | 6.80             | 0.15             | 6.78             | 0.15             | 6.74             | 0.15             | 0.100                | 0.080                | 0.040                | 0.05  | 1            |
| 33 Polyhymnia  | 8.564 | 0.008      | 0.340  | 0.020      | 8.50             | 0.15             | 8.63             | 0.33             | 8.55             | 0.33             | -0.064               | 0.066                | -0.014               | 0.20  | 1            |
| 37 Fides       | 7.328 | 0.006      | 0.270  | 0.007      | 7.29             | 0.24             | 7.39             | 0.24             | 7.29             | 0.24             | -0.038               | 0.062                | -0.038               | 0.13  | 1            |
| 38 Leda        | 8.315 | 0.040      | 0.090  | 0.090      | 8.40             | 0.15             | 8.36             | 0.15             | 8.32             | 0.15             | 0.085                | 0.045                | 0.005                | 0.10  | 1, 4         |
| 45 Eugenia     | 7.422 | 0.005      | 0.130  | 0.006      | 7.50             | 0.15             | 7.44             | 0.07             | 7.46             | 0.07             | 0.078                | 0.018                | 0.038                | 0.18  | 4            |
| 46 Hestia      | 8.400 | 0.020      | 0.120  | 0.040      | 8.50             | 0.15             | 8.38             | 0.06             | 8.36             | 0.06             | 0.100                | -0.020               | -0.040               | 0.08  | 4            |
| 47 Aglaja      | 7.861 | 0.007      | 0.178  | 0.020      | 8.00             | 0.15             | 8.01             | 0.16             | 7.84             | 0.16             | 0.139                | 0.149                | -0.021               | 0.02  | 1            |
| 53 Kalypso     | 8.660 | 0.040      | 0.090  | 0.090      | 8.80             | 0.15             | 8.81             | 0.15             | 8.81             | 0.15             | 0.140                | 0.150                | 0.150                | 0.05  | 1            |
| 57 Mnemosyne   | 7.090 | 0.020      | 0.220  | 0.040      | 7.03             | 0.15             | 6.89             | 0.15             | 7.03             | 0.15             | -0.060               | -0.200               | -0.060               | 0.11  | 3            |
| 58 Concordia   | 8.860 | 0.100      | 0.090  | 0.090      | 8.90             | 0.15             | 8.96             | 0.15             | 8.86             | 0.15             | 0.040                | 0.100                | 0.000                | 0.10  | 3            |
| 60 Echo        | 8.484 | 0.007      | 0.250  | 0.005      | 8.21             | 0.27             | 8.52             | 0.27             | 8.21             | 0.27             | -0.274               | 0.036                | -0.274               | 0.11  | 2            |
| 62 Erato       | 8.600 | 0.100      | 0.090  | 0.090      | 8.70             | 0.15             | 8.61             | 0.15             | 8.76             | 0.15             | 0.100                | 0.010                | 0.160                | 0.20  | 3            |
| 70 Panopaea    | 8.100 | 0.060      | 0.130  | 0.100      | 8.00             | 0.15             | 8.01             | 0.14             | 8.11             | 0.14             | -0.100               | -0.090               | 0.010                | 0.10  | 1            |
| 71 Niobe       | 7.310 | 0.090      | 0.400  | 0.140      | 7.30             | 0.40             | 7.31             | 0.40             | 7.30             | 0.40             | -0.010               | 0.000                | -0.010               | 0.11  | 1            |
| 72 Feronia     | 8.790 | 0.010      | 0.000  | 0.010      | 8.94             | 0.15             | 8.99             | 0.15             | 8.94             | 0.15             | 0.150                | 0.200                | 0.150                | 0.11  | 3            |
| 75 Eurydike    | 8.970 | 0.010      | 0.230  | 0.020      | 8.96             | 0.23             | 8.96             | 0.23             | 8.96             | 0.23             | -0.010               | -0.010               | -0.010               | 0.10  | 1            |
| 76 Freia       | 7.864 | 0.008      | 0.070  | 0.010      | 7.90             | 0.15             | 7.92             | 0.15             | 7.90             | 0.15             | 0.036                | 0.056                | 0.036                | 0.10  | 3            |
| 77 Frigga      | 8.522 | 0.006      | 0.160  | 0.010      | 8.60             | 0.15             | 8.55             | 0.16             | 8.52             | 0.16             | 0.078                | 0.028                | -0.002               | 0.07  | 1            |
| 78 Diana       | 8.018 | 0.005      | 0.080  | 0.009      | 8.09             | 0.08             | 8.13             | 0.08             | 8.09             | 0.08             | 0.072                | 0.112                | 0.072                | 0.02  | 1            |
| 88 Thisbe      | 7.030 | 0.140      | 0.090  | 0.090      | 7.10             | 0.15             | 7.19             | 0.14             | 7.04             | 0.14             | 0.070                | 0.160                | 0.010                | 0.10  | 3            |
| 93 Minerva     | 7.504 | 0.030      | -0.006 | 0.030      | 7.80             | 0.15             | 7.80             | 0.15             | 7.70             | 0.15             | 0.296                | 0.296                | 0.196                | 0.06  | 1, 4         |
| 96 Aegle       | 7.650 | 0.070      | 0.090  | 0.090      | 7.60             | 0.15             | 7.59             | 0.15             | 7.67             | 0.15             | -0.050               | -0.060               | 0.020                | 0.10  | 1            |
| 99 Dike        | 9.350 | 0.130      | 0.090  | 0.090      | 9.50             | 0.15             | 9.44             | 0.15             | 9.43             | 0.15             | 0.150                | 0.090                | 0.080                | 0.20  | 3            |
| 101 Helena     | 8.327 | 0.005      | 0.320  | 0.010      | 8.20             | 0.15             | 8.32             | 0.35             | 8.33             | 0.35             | -0.127               | -0.007               | 0.003                | 0.11  | 1            |
| 102 Miriam     | 9.300 | 0.200      | 0.090  | 0.090      | 9.30             | 0.15             | 9.27             | 0.15             | 9.26             | 0.15             | 0.000                | -0.030               | -0.040               | 0.16  | 3            |
| 106 Dione      | 7.410 | 0.060      | 0.090  | 0.090      | 7.41             | 0.15             | 7.50             | 0.15             | 7.41             | 0.15             | 0.000                | 0.090                | 0.000                | 0.10  | 3            |
| 107 Camilla    | 7.100 | 0.020      | 0.090  | 0.090      | 7.10             | 0.15             | 7.06             | 0.08             | 7.08             | 0.08             | 0.000                | -0.040               | -0.020               | 0.41  | 1            |
| 109 Felicitas  | 8.759 | 0.008      | 0.030  | 0.008      | 8.90             | 0.15             | 8.74             | 0.04             | 8.75             | 0.04             | 0.141                | -0.019               | -0.009               | 0.06  | 1            |
| 114 Kassandra  | 8.275 | 0.020      | 0.090  | 0.090      | 8.20             | 0.15             | 8.23             | 0.15             | 8.26             | 0.15             | -0.075               | -0.045               | -0.015               | 0.12  | 1, 3         |
| 125 Liberatrix | 8.900 | 0.020      | 0.220  | 0.090      | 8.80             | 0.15             | 8.91             | 0.33             | 9.04             | 0.33             | -0.100               | 0.010                | 0.140                | 0.30  | 3            |
| 127 Johanna    | 8.370 | 0.120      | 0.090  | 0.090      | 8.30             | 0.15             | 8.45             | 0.15             | 8.30             | 0.15             | -0.070               | 0.080                | -0.070               | 0.18  | 4            |
| 130 Elektra    | 6.990 | 0.040      | 0.090  | 0.090      | 7.12             | 0.15             | 7.00             | 0.15             | 7.12             | 0.15             | 0.130                | 0.010                | 0.130                | 0.32  | 1            |
| 132 Aethra     | 9.200 | 0.150      | 0.210  | 0.000      | 9.38             | 0.15             | 8.94             | 0.15             | 9.21             | 0.15             | 0.180                | -0.260               | 0.010                | 0.24  | 12           |
| 133 Cyrene     | 7.990 | 0.013      | 0.130  | 0.020      | 7.90             | 0.15             | 7.90             | 0.13             | 7.98             | 0.13             | -0.090               | -0.090               | -0.010               | 0.26  | 1            |

Table 2: *cont.*

| Asteroid |             | $H$    | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|-------------|--------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 134      | Sophrisyne  | 8.770  | 0.010      | 0.280  | 0.020      | 8.76             | 0.28             | 8.75             | 0.28             | 8.76             | 0.28             | -0.010               | -0.020               | -0.010               | 0.18  | 1            |
| 135      | Hertha      | 8.100  | 0.040      | 0.240  | 0.040      | 8.23             | 0.15             | 8.16             | 0.15             | 8.23             | 0.15             | 0.130                | 0.060                | 0.130                | 0.12  | 3            |
| 137      | Meliboea    | 8.100  | 0.050      | 0.090  | 0.090      | 8.10             | 0.15             | 8.01             | 0.15             | 8.05             | 0.15             | 0.000                | -0.090               | -0.050               | 0.10  | 1            |
| 139      | Juewa       | 7.924  | 0.010      | 0.150  | 0.010      | 7.90             | 0.15             | 7.89             | 0.15             | 7.78             | 0.15             | -0.024               | -0.034               | -0.144               | 0.18  | 4            |
| 144      | Vibilia     | 7.920  | 0.020      | 0.170  | 0.040      | 8.00             | 0.15             | 8.03             | 0.17             | 7.91             | 0.17             | 0.080                | 0.110                | -0.010               | 0.14  | 1            |
| 145      | Adeona      | 8.050  | 0.070      | 0.090  | 0.090      | 8.10             | 0.15             | 8.08             | 0.15             | 8.13             | 0.15             | 0.050                | 0.030                | 0.080                | 0.04  | 1            |
| 146      | Lucina      | 8.277  | 0.020      | 0.186  | 0.030      | 8.20             | 0.11             | 8.24             | 0.11             | 8.20             | 0.11             | -0.077               | -0.037               | -0.077               | 0.14  | 1, 4         |
| 148      | Gallia      | 7.400  | 0.100      | 0.090  | 0.090      | 7.63             | 0.15             | 7.61             | 0.15             | 7.63             | 0.15             | 0.230                | 0.210                | 0.230                | 0.07  | 3            |
| 154      | Bertha      | 7.530  | 0.080      | 0.090  | 0.090      | 7.60             | 0.15             | 7.61             | 0.15             | 7.58             | 0.15             | 0.070                | 0.080                | 0.050                | 0.20  | 1            |
| 156      | Xanthippe   | 8.310  | 0.090      | -0.120 | 0.080      | 8.60             | 0.15             | 8.64             | 0.15             | 8.64             | 0.15             | 0.290                | 0.330                | 0.330                | 0.11  | 1            |
| 159      | Aemilia     | 8.100  | 0.100      | 0.090  | 0.090      | 8.20             | 0.15             | 8.25             | 0.15             | 8.12             | 0.15             | 0.100                | 0.150                | 0.020                | 0.20  | 1            |
| 160      | Una         | 9.050  | 0.004      | 0.050  | 0.040      | 9.00             | 0.15             | 9.08             | 0.15             | 9.08             | 0.15             | -0.050               | 0.030                | 0.030                | 0.10  | 4            |
| 161      | Athor       | 9.080  | 0.010      | 0.130  | 0.020      | 9.00             | 0.15             | 8.97             | 0.13             | 9.15             | 0.13             | -0.080               | -0.110               | 0.070                | 0.12  | 1            |
| 163      | Erigone     | 9.480  | 0.010      | -0.040 | 0.010      | 9.70             | 0.15             | 9.44             | -0.04            | 9.47             | -0.04            | 0.220                | -0.040               | -0.010               | 0.37  | 1            |
| 165      | Loreley     | 7.710  | 0.010      | 0.070  | 0.010      | 7.70             | 0.15             | 7.68             | 0.15             | 7.65             | 0.15             | -0.010               | -0.030               | -0.060               | 0.12  | 3            |
| 166      | Rhodope     | 9.750  | 0.050      | 0.090  | 0.090      | 9.80             | 0.15             | 9.81             | 0.15             | 9.89             | 0.15             | 0.050                | 0.060                | 0.140                | 0.13  | 4            |
| 178      | Belisana    | 9.600  | 0.006      | 0.310  | 0.009      | 9.40             | 0.15             | 9.35             | 0.15             | 9.38             | 0.15             | -0.200               | -0.250               | -0.220               | 0.18  | 3            |
| 187      | Lamberta    | 7.980  | 0.040      | -0.040 | 0.040      | 8.20             | 0.15             | 8.08             | 0.15             | 8.16             | 0.15             | 0.220                | 0.100                | 0.180                | 0.32  | 4            |
| 189      | Phthia      | 9.600  | 0.100      | 0.230  | 0.110      | 9.20             | 0.15             | 9.24             | 0.15             | 9.33             | 0.15             | -0.400               | -0.360               | -0.270               | 0.20  | 3            |
| 201      | Penelope    | 8.540  | 0.020      | 0.170  | 0.020      | 8.30             | 0.15             | 8.40             | 0.24             | 8.43             | 0.24             | -0.240               | -0.140               | -0.110               | 0.56  | 1            |
| 211      | Isolda      | 7.900  | 0.030      | 0.120  | 0.040      | 8.00             | 0.15             | 7.89             | 0.12             | 7.89             | 0.12             | 0.100                | -0.010               | -0.010               | 0.09  | 1            |
| 212      | Medea       | 8.180  | 0.060      | 0.090  | 0.090      | 8.30             | 0.15             | 8.27             | 0.15             | 8.28             | 0.15             | 0.120                | 0.090                | 0.100                | 0.08  | 4            |
| 216      | Kleopatra   | 7.350  | 0.020      | 0.280  | 0.030      | 7.10             | 0.15             | 7.17             | 0.29             | 7.30             | 0.29             | -0.250               | -0.180               | -0.050               | 0.68  | 1            |
| 218      | Bianca      | 8.607  | 0.005      | 0.310  | 0.008      | 8.60             | 0.32             | 8.60             | 0.32             | 8.60             | 0.32             | -0.007               | -0.007               | -0.007               | 0.11  | 1            |
| 219      | Thusnelda   | 9.340  | 0.050      | 0.230  | 0.110      | 9.32             | 0.15             | 9.21             | 0.15             | 9.32             | 0.15             | -0.020               | -0.130               | -0.020               | 0.19  | 3            |
| 226      | Weringia    | 9.820  | 0.070      | 0.230  | 0.110      | 9.80             | 0.15             | 9.81             | 0.15             | 9.70             | 0.15             | -0.020               | -0.010               | -0.120               | 0.10  | 1            |
| 230      | Athamantis  | 7.346  | 0.004      | 0.272  | 0.003      | 7.35             | 0.27             | 7.44             | 0.27             | 7.35             | 0.27             | 0.004                | 0.094                | 0.004                | 0.19  | 1, 3         |
| 236      | Honoria     | 8.188  | 0.007      | -0.020 | 0.014      | 8.20             | 0.15             | 7.97             | -0.02            | 8.18             | -0.02            | 0.012                | -0.218               | -0.008               | 0.17  | 1            |
| 258      | Tyche       | 8.500  | 0.020      | 0.230  | 0.020      | 8.50             | 0.23             | 8.39             | 0.23             | 8.50             | 0.23             | 0.000                | -0.110               | 0.000                | 0.39  | 1            |
| 261      | Prymno      | 9.440  | 0.010      | 0.190  | 0.030      | 9.44             | 0.19             | 9.35             | 0.19             | 9.44             | 0.19             | 0.000                | -0.090               | 0.000                | 0.17  | 2            |
| 266      | Aline       | 8.490  | 0.070      | 0.090  | 0.090      | 8.80             | 0.15             | 8.61             | 0.15             | 8.80             | 0.15             | 0.310                | 0.120                | 0.310                | 0.07  | 4            |
| 279      | Thule       | 8.520  | 0.180      | 0.150  | 0.200      | 8.57             | 0.15             | 8.35             | 0.15             | 8.57             | 0.15             | 0.050                | -0.170               | 0.050                | 0.04  | 10           |
| 284      | Amalia      | 10.120 | 0.070      | 0.120  | 0.110      | 10.05            | 0.11             | 10.03            | 0.11             | 10.05            | 0.11             | -0.070               | -0.090               | -0.070               | 0.15  | 1            |
| 288      | Glauke      | 10.000 | 0.200      | 0.230  | 0.110      | 9.70             | 0.15             | 9.67             | 0.15             | 9.84             | 0.15             | -0.300               | -0.330               | -0.160               | 0.90  | 4            |
| 298      | Baptistina  | 11.320 | 0.120      | 0.230  | 0.000      | 11.20            | 0.15             | 11.15            | 0.15             | 11.00            | 0.15             | -0.120               | -0.170               | -0.320               | 0.12  | 12           |
| 317      | Roxane      | 10.070 | 0.010      | 0.490  | 0.040      | 9.70             | 0.15             | 9.69             | 0.15             | 10.03            | 0.15             | -0.370               | -0.380               | -0.040               | 0.60  | 3            |
| 322      | Phaao       | 8.990  | 0.060      | 0.090  | 0.090      | 9.00             | 0.15             | 8.99             | 0.15             | 9.01             | 0.15             | 0.010                | 0.000                | 0.020                | 0.07  | 1            |
| 325      | Heidelberga | 8.770  | 0.010      | 0.230  | 0.020      | 8.60             | 0.15             | 8.59             | 0.15             | 8.65             | 0.15             | -0.170               | -0.180               | -0.120               | 0.19  | 3            |
| 326      | Tamara      | 9.390  | 0.100      | 0.090  | 0.090      | 9.30             | 0.15             | 9.29             | 0.15             | 9.36             | 0.15             | -0.090               | -0.100               | -0.030               | 0.15  | 3            |
| 335      | Roberta     | 8.860  | 0.030      | 0.130  | 0.030      | 8.96             | 0.15             | 9.03             | 0.15             | 8.96             | 0.15             | 0.100                | 0.170                | 0.100                | 0.09  | 3            |
| 338      | Budrosa     | 8.370  | 0.010      | 0.230  | 0.020      | 8.50             | 0.15             | 8.44             | 0.15             | 8.50             | 0.15             | 0.130                | 0.070                | 0.130                | 0.06  | 3            |
| 344      | Desiderata  | 8.030  | 0.040      | 0.090  | 0.090      | 8.08             | 0.15             | 8.28             | 0.15             | 8.08             | 0.15             | 0.050                | 0.250                | 0.050                | 0.16  | 1            |
| 345      | Tercidina   | 8.810  | 0.070      | 0.210  | 0.100      | 8.90             | 0.15             | 8.73             | 0.10             | 8.71             | 0.10             | 0.090                | -0.080               | -0.100               | 0.15  | 1            |
| 346      | Hermentaria | 7.250  | 0.030      | 0.230  | 0.110      | 7.13             | 0.15             | 7.26             | 0.15             | 7.13             | 0.15             | -0.120               | 0.010                | -0.120               | 0.08  | 1, 3         |

Table 2: *cont.*

| Asteroid          | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|-------------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 347 Pariana       | 8.890  | 0.050      | 0.210 | 0.000      | 8.90             | 0.15             | 8.91             | 0.15             | 8.90             | 0.15             | 0.010                | 0.020                | 0.010                | 0.09  | 12           |
| 367 Amicitia      | 10.690 | 0.140      | 0.230 | 0.000      | 10.70            | 0.15             | 10.48            | 0.15             | 10.70            | 0.15             | 0.010                | -0.210               | 0.010                | 0.28  | 12           |
| 375 Ursula        | 7.210  | 0.020      | 0.080 | 0.030      | 7.40             | 0.15             | 7.47             | 0.27             | 7.47             | 0.27             | 0.190                | 0.260                | 0.260                | 0.06  | 4            |
| 379 Huenna        | 8.990  | 0.010      | 0.140 | 0.010      | 8.80             | 0.15             | 8.81             | 0.15             | 8.87             | 0.15             | -0.190               | -0.180               | -0.120               | 0.09  | 3            |
| 386 Siegena       | 7.400  | 0.010      | 0.100 | 0.020      | 7.43             | 0.16             | 7.79             | 0.16             | 7.43             | 0.16             | 0.030                | 0.390                | 0.030                | 0.07  | 1            |
| 387 Aquitania     | 7.440  | 0.020      | 0.020 | 0.020      | 7.60             | 0.15             | 7.55             | 0.15             | 7.41             | 0.15             | 0.160                | 0.110                | -0.030               | 0.24  | 3            |
| 388 Charybdis     | 8.580  | 0.040      | 0.070 | 0.100      | 8.60             | 0.15             | 8.50             | 0.07             | 8.57             | 0.07             | 0.020                | -0.080               | -0.010               | 0.17  | 1            |
| 391 Ingeborg      | 10.900 | 0.200      | 0.230 | 0.000      | 10.80            | 0.15             | 10.75            | 0.15             | 10.10            | 0.15             | -0.100               | -0.150               | -0.800               | 0.22  | 12           |
| 392 Wilhelmina    | 9.590  | 0.010      | 0.090 | 0.090      | 9.70             | 0.15             | 9.66             | 0.15             | 9.70             | 0.15             | 0.110                | 0.070                | 0.110                | 0.11  | 4            |
| 419 Aurelia       | 8.411  | 0.030      | 0.160 | 0.050      | 8.50             | 0.15             | 8.51             | 0.15             | 8.42             | 0.15             | 0.089                | 0.099                | 0.009                | 0.07  | 1            |
| 422 Berolina      | 10.950 | 0.010      | 0.420 | 0.080      | 10.60            | 0.15             | 10.65            | 0.15             | 10.83            | 0.15             | -0.350               | -0.300               | -0.120               | 0.10  | 1            |
| 423 Diotima       | 7.320  | 0.020      | 0.090 | 0.090      | 7.30             | 0.15             | 7.17             | 0.15             | 7.24             | 0.15             | -0.020               | -0.150               | -0.080               | 0.14  | 4            |
| 428 Monachia      | 11.740 | 0.050      | 0.010 | 0.000      | 12.00            | 0.15             | 11.88            | 0.15             | 11.74            | 0.15             | 0.260                | 0.140                | 0.000                | 0.31  | 12           |
| 429 Lotis         | 9.890  | 0.020      | 0.070 | 0.030      | 9.90             | 0.15             | 9.91             | 0.15             | 9.82             | 0.15             | 0.010                | 0.020                | -0.070               | 0.24  | 3            |
| 432 Pythia        | 8.880  | 0.050      | 0.230 | 0.110      | 8.84             | 0.15             | 8.85             | 0.15             | 8.84             | 0.15             | -0.040               | -0.030               | -0.040               | 0.14  | 1            |
| 434 Hungaria      | 11.460 | 0.020      | 0.430 | 0.020      | 11.20            | 0.15             | 11.17            | 0.15             | 11.21            | 0.15             | -0.260               | -0.290               | -0.250               | 0.57  | 4            |
| 443 Photographica | 10.240 | 0.100      | 0.230 | 0.110      | 10.10            | 0.15             | 10.05            | 0.15             | 10.28            | 0.15             | -0.140               | -0.190               | 0.040                | 0.30  | 4            |
| 449 Hamburga      | 9.430  | 0.010      | 0.090 | 0.090      | 9.80             | 0.15             | 9.76             | 0.15             | 9.47             | 0.15             | 0.370                | 0.330                | 0.040                | 0.01  | 3            |
| 453 Tea           | 10.850 | 0.120      | 0.230 | 0.000      | 10.40            | 0.15             | 10.36            | 0.15             | 10.86            | 0.15             | -0.450               | -0.490               | 0.010                | 0.37  | 12           |
| 464 Megaira       | 9.470  | 0.050      | 0.090 | 0.090      | 9.52             | 0.15             | 9.60             | 0.15             | 9.52             | 0.15             | 0.050                | 0.130                | 0.050                | 0.08  | 1            |
| 478 Tergeste      | 7.960  | 0.050      | 0.230 | 0.110      | 7.90             | 0.15             | 7.96             | 0.15             | 7.98             | 0.15             | -0.060               | 0.000                | 0.020                | 0.20  | 1            |
| 482 Petrina       | 8.910  | 0.070      | 0.230 | 0.110      | 8.90             | 0.15             | 8.76             | 0.15             | 8.84             | 0.15             | -0.010               | -0.150               | -0.070               | 0.10  | 3            |
| 486 Cremona       | 10.880 | 0.090      | 0.230 | 0.000      | 11.00            | 0.15             | 11.06            | 0.15             | 10.89            | 0.15             | 0.120                | 0.180                | 0.010                | 0.02  | 12           |
| 488 Kreusa        | 7.800  | 0.100      | 0.090 | 0.090      | 7.90             | 0.15             | 7.86             | 0.15             | 7.81             | 0.15             | 0.100                | 0.060                | 0.010                | 0.20  | 1            |
| 505 Cava          | 8.640  | 0.020      | 0.010 | 0.010      | 8.70             | 0.15             | 8.50             | -0.03            | 8.61             | -0.03            | 0.060                | -0.140               | -0.030               | 0.24  | 4            |
| 510 Mabella       | 9.660  | 0.060      | 0.090 | 0.090      | 9.70             | 0.15             | 9.69             | 0.15             | 9.73             | 0.15             | 0.040                | 0.030                | 0.070                | 0.30  | 1            |
| 512 Taurinensis   | 10.720 | 0.040      | 0.240 | 0.040      | 10.70            | 0.15             | 10.70            | 0.15             | 10.68            | 0.15             | -0.020               | -0.020               | -0.040               | 0.13  | 3            |
| 517 Edith         | 9.520  | 0.010      | 0.150 | 0.050      | 9.50             | 0.15             | 9.41             | 0.15             | 9.35             | 0.15             | -0.020               | -0.110               | -0.170               | 0.18  | 3            |
| 519 Sylvania      | 9.180  | 0.020      | 0.230 | 0.040      | 8.90             | 0.15             | 8.87             | 0.15             | 9.14             | 0.15             | -0.280               | -0.310               | -0.040               | 0.40  | 4            |
| 539 Pamina        | 10.040 | 0.100      | 0.090 | 0.090      | 9.70             | 0.15             | 9.96             | 0.15             | 9.70             | 0.15             | -0.340               | -0.080               | -0.340               | 0.20  | 3            |
| 540 Rosamunde     | 10.740 | 0.130      | 0.230 | 0.000      | 10.50            | 0.15             | 10.55            | 0.15             | 10.76            | 0.15             | -0.240               | -0.190               | 0.020                | 0.53  | 12           |
| 542 Susanna       | 9.640  | 0.086      | 0.240 | 0.110      | 9.30             | 0.15             | 9.29             | 0.15             | 9.36             | 0.15             | -0.340               | -0.350               | -0.280               | 0.10  | 10           |
| 556 Phyllis       | 9.520  | 0.040      | 0.200 | 0.040      | 9.56             | 0.15             | 9.45             | 0.15             | 9.56             | 0.15             | 0.040                | -0.070               | 0.040                | 0.24  | 3            |
| 558 Carmen        | 9.170  | 0.030      | 0.210 | 0.060      | 9.00             | 0.15             | 8.99             | 0.15             | 9.09             | 0.15             | -0.170               | -0.180               | -0.080               | 0.20  | 1            |
| 560 Delila        | 10.800 | 0.060      | 0.090 | 0.090      | 10.90            | 0.15             | 10.85            | 0.15             | 10.60            | 0.15             | 0.100                | 0.050                | -0.200               | 0.10  | 3            |
| 584 Semiramis     | 8.610  | 0.020      | 0.310 | 0.020      | 8.71             | 0.24             | 8.56             | 0.24             | 8.71             | 0.24             | 0.100                | -0.050               | 0.100                | 0.21  | 3            |
| 587 Hypsipyle     | 12.190 | 0.110      | 0.230 | 0.000      | 11.90            | 0.15             | 11.84            | 0.15             | 12.70            | 0.15             | -0.290               | -0.350               | 0.510                | 0.39  | 12           |
| 593 Titania       | 9.290  | 0.020      | 0.060 | 0.020      | 9.30             | 0.15             | 9.21             | 0.06             | 9.28             | 0.06             | 0.010                | -0.080               | -0.010               | 0.25  | 1            |
| 606 Brangane      | 10.200 | 0.100      | 0.090 | 0.090      | 10.20            | 0.15             | 10.21            | 0.15             | 10.38            | 0.15             | 0.000                | 0.010                | 0.180                | 0.18  | 3            |
| 622 Esther        | 10.240 | 0.150      | 0.230 | 0.110      | 10.20            | 0.15             | 10.20            | 0.15             | 10.17            | 0.15             | -0.040               | -0.040               | -0.070               | 0.15  | 3            |
| 674 Rachele       | 7.472  | 0.030      | 0.239 | 0.050      | 7.42             | 0.15             | 7.34             | 0.15             | 7.42             | 0.15             | -0.052               | -0.132               | -0.052               | 0.15  | 1, 3         |
| 695 Bella         | 9.070  | 0.007      | 0.200 | 0.010      | 9.30             | 0.15             | 8.93             | 0.15             | 9.30             | 0.15             | 0.230                | -0.140               | 0.230                | 0.33  | 3            |
| 699 Hela          | 11.830 | 0.110      | 0.230 | 0.110      | 11.72            | 0.15             | 11.18            | 0.15             | 11.72            | 0.15             | -0.110               | -0.650               | -0.110               | 0.55  | 4            |
| 711 Marmulla      | 11.750 | 0.150      | 0.230 | 0.000      | 11.70            | 0.15             | 11.69            | 0.15             | 11.90            | 0.15             | -0.050               | -0.060               | 0.150                | 0.07  | 12           |

Table 2: *cont.*

| Asteroid          | $H$    | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|-------------------|--------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 712 Boliviana     | 8.330  | 0.010      | 0.030  | 0.010      | 8.60             | 0.15             | 8.48             | 0.03             | 8.32             | 0.03             | 0.270                | 0.150                | -0.010               | 0.09  | 1            |
| 722 Frieda        | 12.310 | 0.070      | 0.230  | 0.000      | 12.30            | 0.15             | 12.29            | 0.15             | 12.10            | 0.15             | -0.010               | -0.020               | -0.210               | 0.04  | 12           |
| 726 Joella        | 10.570 | 0.030      | 0.090  | 0.090      | 10.57            | 0.15             | 10.25            | 0.15             | 10.57            | 0.15             | 0.000                | -0.320               | 0.000                | 0.12  | 3            |
| 728 Leonisis      | 13.000 | 0.060      | 0.230  | 0.000      | 12.80            | 0.15             | 12.83            | 0.15             | 12.80            | 0.15             | -0.200               | -0.170               | -0.200               | 0.13  | 12           |
| 739 Mandeville    | 8.760  | 0.050      | 0.090  | 0.090      | 8.60             | 0.15             | 8.66             | 0.15             | 8.50             | 0.15             | -0.160               | -0.100               | -0.260               | 0.14  | 1            |
| 746 Marlu         | 9.810  | 0.010      | 0.140  | 0.010      | 10.00            | 0.15             | 9.71             | 0.15             | 10.00            | 0.15             | 0.190                | -0.100               | 0.190                | 0.23  | 3            |
| 770 Bali          | 11.110 | 0.020      | 0.160  | 0.000      | 10.90            | 0.15             | 10.89            | 0.15             | 11.11            | 0.15             | -0.210               | -0.220               | 0.000                | 0.55  | 12           |
| 776 Berbericia    | 7.632  | 0.008      | 0.140  | 0.010      | 7.68             | 0.34             | 7.79             | 0.34             | 7.68             | 0.34             | 0.048                | 0.158                | 0.048                | 0.21  | 3            |
| 779 Nina          | 8.100  | 0.020      | 0.260  | 0.040      | 8.30             | 0.15             | 7.87             | 0.15             | 8.30             | 0.15             | 0.200                | -0.230               | 0.200                | 0.25  | 3            |
| 782 Montefiore    | 11.560 | 0.050      | 0.230  | 0.000      | 11.50            | 0.15             | 11.23            | 0.15             | 11.58            | 0.15             | -0.060               | -0.330               | 0.020                | 0.43  | 12           |
| 795 Fini          | 9.780  | 0.058      | 0.120  | 0.080      | 9.90             | 0.15             | 9.78             | 0.15             | 9.70             | 0.15             | 0.120                | 0.000                | -0.080               | 0.02  | 10           |
| 822 Lalage        | 12.330 | 0.020      | 0.230  | 0.000      | 12.18            | 0.15             | 12.01            | 0.15             | 12.18            | 0.15             | -0.150               | -0.320               | -0.150               | 0.47  | 12           |
| 823 Sisigambis    | 11.370 | 0.050      | 0.230  | 0.000      | 11.10            | 0.15             | 11.04            | 0.15             | 11.38            | 0.15             | -0.270               | -0.330               | 0.010                | 0.03  | 12           |
| 825 Tanina        | 11.840 | 0.060      | 0.230  | 0.000      | 11.40            | 0.15             | 11.38            | 0.15             | 11.86            | 0.15             | -0.440               | -0.460               | 0.020                | 0.48  | 12           |
| 849 Ara           | 8.330  | 0.010      | 0.210  | 0.010      | 8.00             | 0.15             | 8.04             | 0.15             | 8.10             | 0.15             | -0.330               | -0.290               | -0.230               | 0.34  | 3            |
| 851 Zeissia       | 11.600 | 0.020      | 0.230  | 0.000      | 11.30            | 0.15             | 11.37            | 0.15             | 11.62            | 0.15             | -0.300               | -0.230               | 0.020                | 0.53  | 12           |
| 852 Wladilena     | 10.150 | 0.020      | 0.140  | 0.030      | 9.90             | 0.15             | 9.94             | 0.15             | 9.90             | 0.15             | -0.250               | -0.210               | -0.250               | 0.30  | 4            |
| 853 Nansenia      | 11.690 | 0.060      | 0.090  | 0.000      | 11.50            | 0.15             | 11.38            | 0.15             | 11.69            | 0.15             | -0.190               | -0.310               | 0.000                | 0.11  | 12           |
| 870 Manto         | 11.680 | 0.030      | 0.230  | 0.110      | 11.60            | 0.15             | 11.64            | 0.15             | 13.10            | 0.15             | -0.080               | -0.040               | 1.420                | 0.30  | 3            |
| 901 Brunsia       | 11.610 | 0.110      | 0.230  | 0.000      | 11.50            | 0.15             | 11.46            | 0.15             | 11.35            | 0.15             | -0.110               | -0.150               | -0.260               | 0.12  | 12           |
| 905 Universitas   | 11.660 | 0.040      | 0.090  | 0.000      | 11.50            | 0.15             | 11.43            | 0.15             | 11.65            | 0.15             | -0.160               | -0.230               | -0.010               | 0.23  | 12           |
| 920 Rogeria       | 11.285 | 0.096      | 0.240  | 0.110      | 11.19            | 0.15             | 11.10            | 0.15             | 11.19            | 0.15             | -0.095               | -0.185               | -0.095               | 0.16  | 10           |
| 925 Alphonsina    | 8.410  | 0.070      | 0.230  | 0.110      | 8.40             | 0.15             | 8.25             | 0.15             | 8.33             | 0.15             | -0.010               | -0.160               | -0.080               | 0.16  | 1            |
| 929 Algunde       | 11.860 | 0.112      | 0.240  | 0.110      | 11.60            | 0.15             | 11.62            | 0.15             | 12.10            | 0.15             | -0.260               | -0.240               | 0.240                | 0.15  | 10           |
| 944 Hidalgo       | 10.480 | 0.050      | -0.060 | 0.000      | 10.77            | 0.15             | 10.35            | 0.15             | 10.77            | 0.15             | 0.290                | -0.130               | 0.290                | 0.48  | 12           |
| 945 Barcelona     | 10.140 | 0.010      | 0.230  | 0.110      | 10.13            | 0.15             | 9.96             | 0.15             | 10.13            | 0.15             | -0.010               | -0.180               | -0.010               | 0.09  | 1            |
| 968 Petunia       | 10.250 | 0.050      | 0.230  | 0.000      | 10.10            | 0.15             | 10.11            | 0.15             | 10.26            | 0.15             | -0.150               | -0.140               | 0.010                | 0.07  | 12           |
| 980 Anacostia     | 7.855  | 0.004      | 0.060  | 0.003      | 7.85             | 0.06             | 7.75             | 0.06             | 7.85             | 0.06             | -0.005               | -0.105               | -0.005               | 0.10  | 1            |
| 1025 Riema        | 12.920 | 0.040      | 0.420  | 0.000      | 12.50            | 0.15             | 12.35            | 0.15             | 12.55            | 0.15             | -0.420               | -0.570               | -0.370               | 0.06  | 12           |
| 1060 Magnolia     | 12.710 | 0.060      | 0.230  | 0.000      | 12.70            | 0.15             | 12.60            | 0.15             | 12.70            | 0.15             | -0.010               | -0.110               | -0.010               | 0.09  | 12           |
| 1065 Amundsenia   | 12.460 | 0.094      | 0.240  | 0.110      | 12.00            | 0.15             | 11.95            | 0.15             | 13.20            | 0.15             | -0.460               | -0.510               | 0.740                | 0.15  | 10           |
| 1078 Mentha       | 11.900 | 0.200      | 0.230  | 0.000      | 11.30            | 0.15             | 11.28            | 0.15             | 11.80            | 0.15             | -0.600               | -0.620               | -0.100               | 0.87  | 12           |
| 1083 Salvia       | 12.250 | 0.110      | 0.230  | 0.000      | 12.10            | 0.15             | 11.97            | 0.15             | 12.60            | 0.15             | -0.150               | -0.280               | 0.350                | 0.61  | 12           |
| 1088 Mitaka       | 11.620 | 0.080      | 0.230  | 0.000      | 11.30            | 0.15             | 11.33            | 0.15             | 11.39            | 0.15             | -0.320               | -0.290               | -0.230               | 0.40  | 12           |
| 1103 Sequoia      | 12.530 | 0.080      | 0.420  | 0.000      | 12.10            | 0.15             | 12.04            | 0.15             | 12.25            | 0.15             | -0.430               | -0.490               | -0.280               | 0.51  | 12           |
| 1117 Reginita     | 11.690 | 0.100      | 0.230  | 0.000      | 11.70            | 0.15             | 11.75            | 0.15             | 11.90            | 0.15             | 0.010                | 0.060                | 0.210                | 0.13  | 12           |
| 1123 Shapleya     | 11.590 | 0.130      | 0.230  | 0.000      | 11.60            | 0.15             | 11.57            | 0.15             | 11.70            | 0.15             | 0.010                | -0.020               | 0.110                | 0.28  | 12           |
| 1126 Otero        | 12.098 | 0.071      | 0.240  | 0.110      | 12.10            | 0.15             | 11.74            | 0.15             | 12.10            | 0.15             | 0.002                | -0.358               | 0.002                | 0.69  | 10           |
| 1131 Porzia       | 13.100 | 0.140      | 0.230  | 0.000      | 13.00            | 0.15             | 12.87            | 0.15             | 13.00            | 0.15             | -0.100               | -0.230               | -0.100               | 0.23  | 12           |
| 1153 Wallenbergia | 12.310 | 0.080      | 0.230  | 0.000      | 12.00            | 0.15             | 11.99            | 0.15             | 12.10            | 0.15             | -0.310               | -0.320               | -0.210               | 0.33  | 12           |
| 1177 Gonnessia    | 9.240  | 0.139      | 0.120  | 0.080      | 9.30             | 0.15             | 9.10             | 0.15             | 9.30             | 0.15             | 0.060                | -0.140               | 0.060                | 0.10  | 10           |
| 1204 Renzia       | 12.140 | 0.090      | 0.230  | 0.110      | 12.20            | 0.15             | 11.91            | 0.15             | 12.20            | 0.15             | 0.060                | -0.230               | 0.060                | 0.42  | 4            |
| 1235 Schorria     | 13.100 | 0.040      | 0.090  | 0.000      | 12.68            | 0.15             | 12.91            | 0.15             | 12.68            | 0.15             | -0.420               | -0.190               | -0.420               | 1.40  | 12           |
| 1270 Datura       | 12.610 | 0.120      | 0.230  | 0.000      | 12.40            | 0.15             | 12.38            | 0.15             | 12.50            | 0.15             | -0.210               | -0.230               | -0.110               | 0.41  | 12           |

Table 2: *cont.*

| Asteroid |              | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|--------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 1314     | Paula        | 12.980 | 0.086      | 0.240 | 0.110      | 12.68            | 0.15             | 12.73            | 0.15             | 12.68            | 0.15             | -0.300               | -0.250               | -0.300               | 0.83  | 10           |
| 1338     | Duponta      | 12.798 | 0.064      | 0.200 | 0.030      | 12.30            | 0.15             | 12.52            | 0.15             | 12.30            | 0.15             | -0.498               | -0.278               | -0.498               | 0.26  | 9, 10        |
| 1367     | Nongoma      | 12.300 | 0.100      | 0.230 | 0.000      | 12.00            | 0.15             | 11.94            | 0.15             | 13.00            | 0.15             | -0.300               | -0.360               | 0.700                | 0.30  | 12           |
| 1374     | Isora        | 13.670 | 0.150      | 0.230 | 0.000      | 13.30            | 0.15             | 13.13            | 0.15             | 13.50            | 0.15             | -0.370               | -0.540               | -0.170               | 0.20  | 12           |
| 1376     | Michelle     | 12.810 | 0.040      | 0.230 | 0.000      | 12.20            | 0.15             | 12.47            | 0.15             | 12.20            | 0.15             | -0.610               | -0.340               | -0.610               | 0.19  | 12           |
| 1382     | Gerti        | 12.510 | 0.010      | 0.230 | 0.000      | 12.20            | 0.15             | 11.97            | 0.15             | 12.20            | 0.15             | -0.310               | -0.540               | -0.310               | 0.29  | 12           |
| 1405     | Sibelius     | 12.570 | 0.078      | 0.240 | 0.110      | 12.50            | 0.15             | 12.48            | 0.15             | 12.30            | 0.15             | -0.070               | -0.090               | -0.270               | 0.11  | 10           |
| 1419     | Danzig       | 11.450 | 0.140      | 0.230 | 0.000      | 11.20            | 0.15             | 11.25            | 0.15             | 11.30            | 0.15             | -0.250               | -0.200               | -0.150               | 0.92  | 12           |
| 1429     | Pemba        | 12.740 | 0.200      | 0.230 | 0.110      | 12.20            | 0.15             | 12.18            | 0.15             | 12.50            | 0.15             | -0.540               | -0.560               | -0.240               | 0.30  | 4            |
| 1453     | Fennia       | 12.835 | 0.060      | 0.272 | 0.000      | 12.40            | 0.15             | 12.38            | 0.15             | 12.83            | 0.15             | -0.435               | -0.455               | -0.005               | 0.15  | 9, 12        |
| 1472     | Muonio       | 12.620 | 0.058      | 0.240 | 0.110      | 12.70            | 0.15             | 12.22            | 0.15             | 12.70            | 0.15             | 0.080                | -0.400               | 0.080                | 0.34  | 10           |
| 1509     | Esclangona   | 12.858 | 0.149      | 0.240 | 0.110      | 12.64            | 0.15             | 12.36            | 0.15             | 12.64            | 0.15             | -0.218               | -0.498               | -0.218               | 0.13  | 10           |
| 1583     | Antilochus   | 8.590  | 0.060      | 0.090 | 0.000      | 8.50             | 0.15             | 8.52             | 0.15             | 8.58             | 0.15             | -0.090               | -0.070               | -0.010               | 0.07  | 12           |
| 1593     | Fagnes       | 13.381 | 0.030      | 0.149 | 0.000      | 13.10            | 0.15             | 13.00            | 0.15             | 13.20            | 0.15             | -0.281               | -0.381               | -0.181               | 0.41  | 3, 12        |
| 1613     | Smiley       | 11.630 | 0.030      | 0.230 | 0.000      | 11.40            | 0.15             | 11.55            | 0.15             | 11.63            | 0.15             | -0.230               | -0.080               | 0.000                | 0.20  | 12           |
| 1621     | Druzhba      | 12.370 | 0.090      | 0.230 | 0.000      | 11.70            | 0.15             | 11.70            | 0.15             | 12.39            | 0.15             | -0.670               | -0.670               | 0.020                | 0.16  | 12           |
| 1629     | Pecker       | 12.360 | 0.103      | 0.240 | 0.110      | 12.30            | 0.15             | 12.34            | 0.15             | 12.60            | 0.15             | -0.060               | -0.020               | 0.240                | 0.08  | 10           |
| 1640     | Nemo         | 13.580 | 0.130      | 0.230 | 0.000      | 13.10            | 0.15             | 13.00            | 0.15             | 13.10            | 0.15             | -0.480               | -0.580               | -0.480               | 0.52  | 12           |
| 1644     | Rafita       | 11.860 | 0.020      | 0.230 | 0.110      | 11.82            | 0.15             | 11.35            | 0.15             | 11.82            | 0.15             | -0.040               | -0.510               | -0.040               | 0.31  | 1            |
| 1656     | Suomi        | 13.146 | 0.100      | 0.230 | 0.000      | 12.40            | 0.15             | 12.67            | 0.15             | 13.16            | 0.15             | -0.746               | -0.476               | 0.014                | 0.10  | 12           |
| 1657     | Roemera      | 12.890 | 0.160      | 0.230 | 0.000      | 12.84            | 0.15             | 12.66            | 0.15             | 12.84            | 0.15             | -0.050               | -0.230               | -0.050               | 0.09  | 12           |
| 1665     | Gaby         | 11.900 | 0.200      | 0.230 | 0.110      | 11.80            | 0.15             | 11.66            | 0.15             | 11.85            | 0.15             | -0.100               | -0.240               | -0.050               | 0.27  | 3            |
| 1667     | Pels         | 12.090 | 0.040      | 0.230 | 0.000      | 11.90            | 0.15             | 11.92            | 0.15             | 12.10            | 0.15             | -0.190               | -0.170               | 0.010                | 0.25  | 12           |
| 1675     | Simonida     | 11.900 | 0.060      | 0.230 | 0.000      | 11.80            | 0.15             | 11.77            | 0.15             | 11.91            | 0.15             | -0.100               | -0.130               | 0.010                | 0.26  | 12           |
| 1689     | Floris-Jan   | 11.740 | 0.050      | 0.230 | 0.110      | 11.70            | 0.15             | 11.65            | 0.15             | 11.82            | 0.15             | -0.040               | -0.090               | 0.080                | 0.40  | 1            |
| 1717     | Arlon        | 12.430 | 0.094      | 0.240 | 0.110      | 12.30            | 0.15             | 12.19            | 0.15             | 12.90            | 0.15             | -0.130               | -0.240               | 0.470                | 0.08  | 10           |
| 1718     | Namibia      | 13.800 | 0.130      | 0.050 | 0.120      | 13.80            | 0.15             | 13.68            | 0.15             | 13.50            | 0.15             | 0.000                | -0.120               | -0.300               | 0.16  | 10           |
| 1722     | Goffin       | 12.180 | 0.100      | 0.150 | 0.200      | 12.00            | 0.15             | 12.04            | 0.15             | 12.30            | 0.15             | -0.180               | -0.140               | 0.120                | 0.60  | 10           |
| 1736     | Floirac      | 12.330 | 0.086      | 0.240 | 0.110      | 12.20            | 0.15             | 12.21            | 0.15             | 12.20            | 0.15             | -0.130               | -0.120               | -0.130               | 0.08  | 10           |
| 1777     | Gehrels      | 11.773 | 0.030      | 0.343 | 0.000      | 11.60            | 0.15             | 11.43            | 0.15             | 11.10            | 0.15             | -0.173               | -0.343               | -0.673               | 0.23  | 10, 12       |
| 1806     | Derice       | 12.140 | 0.078      | 0.240 | 0.110      | 12.00            | 0.15             | 12.01            | 0.15             | 12.00            | 0.15             | -0.140               | -0.130               | -0.140               | 0.07  | 10           |
| 1830     | Pogson       | 12.659 | 0.054      | 0.291 | 0.050      | 12.80            | 0.15             | 12.76            | 0.15             | 12.45            | 0.15             | 0.141                | 0.101                | -0.209               | 0.11  | 9            |
| 1862     | Apollo       | 16.384 | 0.055      | 0.240 | 0.110      | 16.25            | 0.09             | 16.06            | 0.09             | 16.25            | 0.09             | -0.134               | -0.324               | -0.134               | 0.21  | 10           |
| 1863     | Antinous     | 15.639 | 0.058      | 0.119 | 0.020      | 15.54            | 0.15             | 15.33            | 0.15             | 15.54            | 0.15             | -0.099               | -0.309               | -0.099               | 0.22  | 4, 10        |
| 1865     | Cerberus     | 16.965 | 0.040      | 0.232 | 0.000      | 16.84            | 0.15             | 16.54            | 0.15             | 16.84            | 0.15             | -0.125               | -0.425               | -0.125               | 1.55  | 1, 12        |
| 1866     | Sisyphus     | 12.510 | 0.149      | 0.235 | 0.110      | 13.00            | 0.15             | 12.32            | 0.15             | 13.00            | 0.15             | 0.490                | -0.190               | 0.490                | 0.08  | 10           |
| 1915     | Quetzalcoatl | 18.880 | 0.110      | 0.060 | 0.080      | 18.97            | 0.10             | 17.39            | 0.10             | 18.97            | 0.10             | 0.090                | -1.490               | 0.090                | 0.20  | 1            |
| 1916     | Boreas       | 14.860 | 0.112      | 0.120 | 0.050      | 14.93            | 0.15             | 14.62            | 0.15             | 14.93            | 0.15             | 0.070                | -0.240               | 0.070                | 0.33  | 10           |
| 1943     | Anteros      | 15.890 | 0.140      | 0.230 | 0.000      | 15.50            | 0.15             | 15.50            | 0.15             | 15.75            | 0.15             | -0.390               | -0.390               | -0.140               | 0.07  | 6, 12        |
| 1951     | Lick         | 14.350 | 0.200      | 0.180 | 0.000      | 14.70            | 0.15             | 13.89            | 0.15             | 14.51            | 0.15             | 0.350                | -0.460               | 0.160                | 0.24  | 10, 12       |
| 1967     | Menzel       | 12.250 | 0.058      | 0.240 | 0.110      | 12.10            | 0.15             | 12.11            | 0.15             | 12.30            | 0.15             | -0.150               | -0.140               | 0.050                | 0.24  | 10           |
| 1979     | Sakharov     | 13.800 | 0.054      | 0.340 | 0.030      | 13.60            | 0.15             | 13.49            | 0.15             | 13.50            | 0.15             | -0.200               | -0.310               | -0.300               | 0.13  | 10           |
| 1980     | Tezcatlipoca | 13.960 | 0.100      | 0.230 | 0.000      | 13.92            | 0.15             | 13.66            | 0.15             | 13.92            | 0.15             | -0.040               | -0.300               | -0.040               | 0.72  | 12           |
| 1981     | Midas        | 15.600 | 0.200      | 0.230 | 0.000      | 15.20            | 0.15             | 15.10            | 0.15             | 15.50            | 0.15             | -0.400               | -0.500               | -0.100               | 0.87  | 12           |

Table 2: *cont.*

| Asteroid            | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|---------------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 1991 Darwin         | 13.600 | 0.070      | 0.230 | 0.000      | 13.40            | 0.15             | 13.34            | 0.15             | 12.90            | 0.15             | -0.200               | -0.260               | -0.700               | 0.08  | 12           |
| 2002 Euler          | 12.700 | 0.103      | 0.240 | 0.110      | 12.30            | 0.15             | 12.35            | 0.15             | 12.10            | 0.15             | -0.400               | -0.350               | -0.600               | 0.31  | 10           |
| 2006 Polonskaya     | 13.350 | 0.071      | 0.420 | 0.060      | 12.90            | 0.15             | 12.90            | 0.15             | 12.60            | 0.15             | -0.450               | -0.450               | -0.750               | 0.08  | 10           |
| 2049 Grietje        | 15.600 | 0.200      | 0.420 | 0.000      | 14.80            | 0.15             | 14.70            | 0.15             | 14.90            | 0.15             | -0.800               | -0.900               | -0.700               | 0.25  | 12           |
| 2063 Bacchus        | 17.250 | 0.200      | 0.230 | 0.100      | 17.10            | 0.15             | 17.12            | 0.15             | 17.10            | 0.15             | -0.150               | -0.130               | -0.150               | 0.14  | 6            |
| 2094 Magnitka       | 12.490 | 0.206      | 0.400 | 0.200      | 11.90            | 0.15             | 12.08            | 0.15             | 12.00            | 0.15             | -0.590               | -0.410               | -0.490               | 0.86  | 10           |
| 2100 Ra-Shalom      | 16.054 | 0.070      | 0.120 | 0.040      | 16.05            | 0.12             | 16.12            | 0.12             | 16.05            | 0.12             | -0.004               | 0.066                | -0.004               | 0.33  | 3, 6         |
| 2110 Moore-Sitterly | 13.620 | 0.064      | 0.240 | 0.110      | 13.30            | 0.15             | 13.15            | 0.15             | 13.80            | 0.15             | -0.320               | -0.470               | 0.180                | 0.37  | 10           |
| 2121 Sevastopol     | 12.480 | 0.086      | 0.290 | 0.060      | 12.10            | 0.15             | 12.27            | 0.15             | 12.30            | 0.15             | -0.380               | -0.210               | -0.180               | 0.15  | 10           |
| 2212 Hephaistos     | 13.525 | 0.070      | 0.230 | 0.000      | 13.20            | 0.15             | 13.16            | 0.15             | 13.87            | 0.15             | -0.325               | -0.365               | 0.345                | 0.08  | 12           |
| 2253 Espinette      | 13.130 | 0.120      | 0.230 | 0.000      | 12.60            | 0.15             | 12.68            | 0.15             | 12.90            | 0.15             | -0.530               | -0.450               | -0.230               | 0.48  | 12           |
| 2259 Sofievka       | 12.480 | 0.071      | 0.120 | 0.080      | 12.40            | 0.15             | 12.49            | 0.15             | 12.60            | 0.15             | -0.080               | 0.010                | 0.120                | 0.10  | 10           |
| 2382 Nonie          | 11.600 | 0.200      | 0.090 | 0.000      | 11.40            | 0.15             | 11.65            | 0.15             | 11.40            | 0.15             | -0.200               | 0.050                | -0.200               | 0.05  | 12           |
| 2398 Jilin          | 13.540 | 0.094      | 0.240 | 0.110      | 13.20            | 0.15             | 13.25            | 0.15             | 13.60            | 0.15             | -0.340               | -0.290               | 0.060                | 0.12  | 10           |
| 2478 Tokai          | 12.370 | 0.058      | 0.330 | 0.040      | 12.00            | 0.15             | 12.14            | 0.15             | 12.80            | 0.15             | -0.370               | -0.230               | 0.430                | 0.41  | 10           |
| 2486 Metsahovi      | 12.782 | 0.064      | 0.240 | 0.110      | 12.40            | 0.15             | 12.43            | 0.15             | 12.40            | 0.15             | -0.382               | -0.352               | -0.382               | 0.11  | 10           |
| 2501 Lohja          | 12.155 | 0.030      | 0.234 | 0.000      | 11.80            | 0.15             | 11.94            | 0.15             | 12.08            | 0.15             | -0.355               | -0.215               | -0.075               | 0.35  | 10, 12       |
| 2544 Gubarev        | 12.350 | 0.112      | 0.240 | 0.110      | 11.90            | 0.15             | 11.83            | 0.15             | 12.30            | 0.15             | -0.450               | -0.520               | -0.050               | 0.34  | 10           |
| 2577 Litva          | 13.480 | 0.090      | 0.420 | 0.000      | 13.18            | 0.15             | 12.67            | 0.15             | 13.18            | 0.15             | -0.300               | -0.810               | -0.300               | 0.36  | 12           |
| 2642 Vesale         | 12.450 | 0.100      | 0.230 | 0.000      | 12.50            | 0.15             | 12.46            | 0.15             | 12.70            | 0.15             | 0.050                | 0.010                | 0.250                | 0.39  | 12           |
| 2659 Millis         | 11.650 | 0.020      | 0.090 | 0.000      | 11.60            | 0.15             | 11.67            | 0.15             | 11.66            | 0.15             | -0.050               | 0.020                | 0.010                | 0.53  | 12           |
| 2714 Matti          | 13.500 | 0.090      | 0.230 | 0.000      | 12.70            | 0.15             | 12.72            | 0.15             | 13.40            | 0.15             | -0.800               | -0.780               | -0.100               | 0.25  | 12           |
| 2754 Efimov         | 13.920 | 0.054      | 0.290 | 0.020      | 13.50            | 0.15             | 13.45            | 0.15             | 13.50            | 0.15             | -0.420               | -0.470               | -0.420               | 0.16  | 10           |
| 2794 Kulik          | 13.480 | 0.130      | 0.230 | 0.000      | 12.80            | 0.15             | 12.86            | 0.15             | 12.70            | 0.15             | -0.680               | -0.620               | -0.780               | 0.22  | 12           |
| 2815 Soma           | 12.980 | 0.078      | 0.240 | 0.110      | 12.60            | 0.15             | 12.64            | 0.15             | 13.20            | 0.15             | -0.380               | -0.340               | 0.220                | 0.08  | 10           |
| 2830 Greenwich      | 12.610 | 0.050      | 0.230 | 0.110      | 12.30            | 0.15             | 12.24            | 0.15             | 12.64            | 0.15             | -0.310               | -0.370               | 0.030                | 0.05  | 1            |
| 2886 Tinkaping      | 13.280 | 0.100      | 0.230 | 0.000      | 13.20            | 0.15             | 13.01            | 0.15             | 13.20            | 0.15             | -0.080               | -0.270               | -0.080               | 0.13  | 12           |
| 2897 Ole Romer      | 13.640 | 0.121      | 0.240 | 0.110      | 13.20            | 0.15             | 13.16            | 0.15             | 13.40            | 0.15             | -0.440               | -0.480               | -0.240               | 0.14  | 10           |
| 2943 Heinrich       | 12.820 | 0.130      | 0.240 | 0.110      | 12.80            | 0.15             | 12.51            | 0.15             | 12.80            | 0.15             | -0.020               | -0.310               | -0.020               | 0.20  | 10           |
| 2954 Delsemme       | 13.580 | 0.090      | 0.230 | 0.000      | 13.40            | 0.15             | 13.34            | 0.15             | 13.50            | 0.15             | -0.180               | -0.240               | -0.080               | 0.21  | 12           |
| 3066 McFadden       | 11.240 | 0.080      | 0.230 | 0.000      | 11.10            | 0.15             | 11.09            | 0.15             | 11.20            | 0.15             | -0.140               | -0.150               | -0.040               | 0.04  | 12           |
| 3073 Kursk          | 13.860 | 0.112      | 0.240 | 0.110      | 13.40            | 0.15             | 13.38            | 0.15             | 13.50            | 0.15             | -0.460               | -0.480               | -0.360               | 0.21  | 10           |
| 3101 Goldberger     | 14.670 | 0.100      | 0.420 | 0.000      | 13.80            | 0.15             | 13.76            | 0.15             | 14.20            | 0.15             | -0.870               | -0.910               | -0.470               | 0.96  | 12           |
| 3102 Krok           | 16.524 | 0.150      | 0.317 | 0.110      | 16.10            | 0.15             | 15.89            | 0.15             | 15.60            | 0.15             | -0.424               | -0.634               | -0.924               | 1.00  | 3, 10        |
| 3103 Eger           | 15.653 | 0.070      | 0.420 | 0.080      | 15.38            | 0.15             | 15.08            | 0.15             | 15.38            | 0.15             | -0.273               | -0.573               | -0.273               | 0.60  | 10           |
| 3116 Goodricke      | 12.620 | 0.070      | 0.230 | 0.000      | 12.40            | 0.15             | 12.39            | 0.15             | 12.50            | 0.15             | -0.220               | -0.230               | -0.120               | 0.09  | 12           |
| 3121 Tamines        | 13.460 | 0.078      | 0.300 | 0.100      | 13.40            | 0.15             | 13.12            | 0.15             | 13.40            | 0.15             | -0.060               | -0.340               | -0.060               | 0.04  | 10           |
| 3122 Florence       | 14.515 | 0.110      | 0.266 | 0.000      | 14.00            | 0.15             | 13.97            | 0.15             | 14.20            | 0.15             | -0.515               | -0.545               | -0.315               | 0.17  | 10, 12       |
| 3200 Phaethon       | 14.345 | 0.064      | 0.164 | 0.000      | 14.60            | 0.15             | 14.17            | 0.15             | 14.51            | 0.15             | 0.255                | -0.175               | 0.165                | 0.13  | 10, 12       |
| 3253 Gradie         | 13.590 | 0.060      | 0.230 | 0.000      | 13.10            | 0.15             | 13.10            | 0.15             | 13.40            | 0.15             | -0.490               | -0.490               | -0.190               | 0.54  | 12           |
| 3255 Tholen         | 13.840 | 0.040      | 0.230 | 0.000      | 13.20            | 0.15             | 13.20            | 0.15             | 13.60            | 0.15             | -0.640               | -0.640               | -0.240               | 0.08  | 12           |
| 3279 Solon          | 13.410 | 0.064      | 0.240 | 0.110      | 13.30            | 0.15             | 12.99            | 0.15             | 13.30            | 0.15             | -0.110               | -0.420               | -0.110               | 0.85  | 10           |
| 3287 Olmstead       | 14.370 | 0.100      | 0.230 | 0.000      | 14.00            | 0.15             | 13.97            | 0.15             | 15.00            | 0.15             | -0.370               | -0.400               | 0.630                | 0.36  | 12           |
| 3309 Brorfelde      | 14.062 | 0.064      | 0.287 | 0.000      | 13.50            | 0.15             | 13.52            | 0.15             | 13.90            | 0.15             | -0.562               | -0.542               | -0.162               | 0.14  | 9, 12        |

Table 2: *cont.*

| Asteroid | $H$          | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{A\&D}}$ | $G_{\text{A\&D}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{A\&D}} - H$ | $H_{\text{JPL}} - H$ | Ampl.  | Reference(s) |    |
|----------|--------------|------------|-------|------------|------------------|------------------|-------------------|-------------------|------------------|------------------|----------------------|-----------------------|----------------------|--------|--------------|----|
| 3352     | McAuliffe    | 16.068     | 0.112 | 0.190      | 0.100            | 15.60            | 0.15              | 15.50             | 0.15             | 15.80            | 0.15                 | -0.468                | -0.568               | -0.268 | 0.20         | 10 |
| 3362     | Khufu        | 18.390     | 0.140 | 0.230      | 0.000            | 18.30            | 0.15              | 18.14             | 0.15             | 18.30            | 0.15                 | -0.090                | -0.250               | -0.090 | 0.14         | 12 |
| 3376     | Armandhammer | 12.540     | 0.064 | 0.240      | 0.110            | 12.40            | 0.15              | 12.40             | 0.15             | 12.40            | 0.15                 | -0.140                | -0.140               | -0.140 | 0.04         | 10 |
| 3402     | Wisdom       | 15.340     | 0.121 | 0.240      | 0.110            | 14.90            | 0.15              | 14.88             | 0.15             | 15.20            | 0.15                 | -0.440                | -0.460               | -0.140 | 0.74         | 10 |
| 3507     | Vilas        | 11.560     | 0.040 | 0.420      | 0.000            | 11.30            | 0.15              | 11.37             | 0.15             | 11.30            | 0.15                 | -0.260                | -0.190               | -0.260 | 0.29         | 12 |
| 3553     | Mera         | 16.650     | 0.139 | 0.240      | 0.110            | 16.40            | 0.15              | 16.35             | 0.15             | 16.50            | 0.15                 | -0.250                | -0.300               | -0.150 | 0.08         | 10 |
| 3554     | Amun         | 15.870     | 0.070 | 0.260      | 0.000            | 15.60            | 0.15              | 15.53             | 0.15             | 15.87            | 0.15                 | -0.270                | -0.340               | 0.000  | 0.19         | 12 |
| 3576     | Galina       | 13.200     | 0.112 | 0.240      | 0.110            | 12.90            | 0.15              | 12.89             | 0.15             | 13.10            | 0.15                 | -0.300                | -0.310               | -0.100 | 0.05         | 10 |
| 3577     | Putilin      | 10.600     | 0.100 | 0.090      | 0.000            | 10.30            | 0.15              | 10.50             | 0.15             | 10.40            | 0.15                 | -0.300                | -0.100               | -0.200 | 0.10         | 12 |
| 3581     | Alvarez      | 12.400     | 0.150 | 0.090      | 0.000            | 12.10            | 0.15              | 12.11             | 0.15             | 12.10            | 0.15                 | -0.300                | -0.290               | -0.300 | 0.06         | 12 |
| 3638     | Davis        | 11.640     | 0.030 | 0.090      | 0.000            | 11.30            | 0.15              | 11.37             | 0.15             | 11.40            | 0.15                 | -0.340                | -0.270               | -0.240 | 0.40         | 12 |
| 3665     | Fitzgerald   | 13.460     | 0.184 | 0.240      | 0.200            | 12.90            | 0.15              | 12.81             | 0.15             | 12.60            | 0.15                 | -0.560                | -0.650               | -0.860 | 0.08         | 10 |
| 3671     | Dionysus     | 16.670     | 0.080 | 0.210      | 0.030            | 16.50            | 0.15              | 16.33             | 0.15             | 16.30            | 0.15                 | -0.170                | -0.340               | -0.370 | 0.12         | 8  |
| 3673     | Levy         | 13.140     | 0.078 | 0.280      | 0.080            | 12.80            | 0.15              | 12.78             | 0.15             | 13.00            | 0.15                 | -0.340                | -0.360               | -0.140 | 0.13         | 10 |
| 3691     | Bede         | 15.220     | 0.100 | 0.430      | 0.080            | 14.50            | 0.15              | 14.49             | 0.15             | 14.90            | 0.15                 | -0.720                | -0.730               | -0.320 | 0.50         | 10 |
| 3752     | Camillo      | 15.410     | 0.130 | 0.230      | 0.110            | 15.50            | 0.15              | 15.14             | 0.15             | 15.50            | 0.15                 | 0.090                 | -0.270               | 0.090  | 1.10         | 6  |
| 3757     | 1982 XB      | 19.120     | 0.060 | 0.240      | 0.040            | 18.95            | 0.15              | 19.13             | 0.15             | 18.95            | 0.15                 | -0.170                | 0.010                | -0.170 | 0.14         | 4  |
| 3824     | Brendalee    | 13.520     | 0.020 | 0.230      | 0.000            | 13.20            | 0.15              | 13.24             | 0.15             | 13.20            | 0.15                 | -0.320                | -0.280               | -0.320 | 0.18         | 12 |
| 3825     | Nurnberg     | 13.140     | 0.071 | 0.240      | 0.110            | 12.70            | 0.15              | 12.70             | 0.15             | 13.00            | 0.15                 | -0.440                | -0.440               | -0.140 | 0.71         | 10 |
| 3838     | Epona        | 15.850     | 0.054 | 0.050      | 0.010            | 15.50            | 0.15              | 15.45             | 0.15             | 15.50            | 0.15                 | -0.350                | -0.400               | -0.350 | 0.05         | 10 |
| 3868     | Mendoza      | 12.710     | 0.040 | 0.220      | 0.030            | 12.40            | 0.15              | 12.40             | 0.15             | 13.00            | 0.15                 | -0.310                | -0.310               | 0.290  | 0.11         | 10 |
| 3888     | Hoyt         | 13.260     | 0.130 | 0.240      | 0.110            | 12.70            | 0.15              | 12.55             | 0.15             | 12.90            | 0.15                 | -0.560                | -0.710               | -0.360 | 0.70         | 10 |
| 3896     | Pordenone    | 11.610     | 0.103 | 0.240      | 0.110            | 11.30            | 0.15              | 11.37             | 0.15             | 11.30            | 0.15                 | -0.310                | -0.240               | -0.310 | 0.25         | 10 |
| 3913     | Chemin       | 13.290     | 0.149 | 0.240      | 0.110            | 12.70            | 0.15              | 12.60             | 0.15             | 12.20            | 0.15                 | -0.590                | -0.690               | -1.090 | 0.45         | 10 |
| 3918     | Brel         | 13.030     | 0.064 | 0.240      | 0.110            | 12.50            | 0.15              | 12.57             | 0.15             | 13.30            | 0.15                 | -0.530                | -0.460               | 0.270  | 0.25         | 10 |
| 3928     | Randa        | 13.650     | 0.206 | 0.240      | 0.110            | 13.30            | 0.15              | 13.17             | 0.15             | 13.30            | 0.15                 | -0.350                | -0.480               | -0.350 | 0.55         | 10 |
| 3953     | Perth        | 14.060     | 0.040 | 0.230      | 0.000            | 13.60            | 0.15              | 13.45             | 0.15             | 13.60            | 0.15                 | -0.460                | -0.610               | -0.460 | 1.09         | 12 |
| 3982     | Kastel'      | 13.350     | 0.080 | 0.510      | 0.130            | 13.20            | 0.15              | 12.80             | 0.15             | 13.20            | 0.15                 | -0.150                | -0.550               | -0.150 | 0.27         | 10 |
| 4029     | Bridges      | 12.960     | 0.094 | 0.240      | 0.110            | 12.80            | 0.15              | 12.63             | 0.15             | 12.90            | 0.15                 | -0.160                | -0.330               | -0.060 | 0.21         | 10 |
| 4082     | Swann        | 13.460     | 0.206 | 0.030      | 0.150            | 12.90            | 0.15              | 13.28             | 0.15             | 12.90            | 0.15                 | -0.560                | -0.180               | -0.560 | 0.67         | 10 |
| 4179     | Toutatis     | 15.300     | 0.160 | 0.100      | 0.000            | 15.30            | 0.10              | 15.21             | 0.10             | 15.30            | 0.10                 | 0.000                 | -0.090               | 0.000  | 0.07         | 12 |
| 4197     | 1982 TA      | 14.800     | 0.200 | 0.010      | 0.000            | 14.60            | 0.15              | 14.83             | 0.15             | 14.60            | 0.15                 | -0.200                | 0.030                | -0.200 | 0.28         | 12 |
| 4263     | Abashiri     | 12.930     | 0.094 | 0.240      | 0.110            | 12.60            | 0.15              | 12.62             | 0.15             | 12.60            | 0.15                 | -0.330                | -0.310               | -0.330 | 0.15         | 10 |
| 4285     | Hulkower     | 12.960     | 0.086 | 0.240      | 0.110            | 12.40            | 0.15              | 12.33             | 0.15             | 12.10            | 0.15                 | -0.560                | -0.630               | -0.860 | 0.58         | 10 |
| 4323     | Hortulus     | 13.570     | 0.094 | 0.240      | 0.110            | 13.60            | 0.15              | 13.34             | 0.15             | 13.60            | 0.15                 | 0.030                 | -0.230               | 0.030  | 0.23         | 10 |
| 4335     | Verona       | 13.650     | 0.112 | 0.240      | 0.110            | 13.30            | 0.15              | 13.25             | 0.15             | 13.60            | 0.15                 | -0.350                | -0.400               | -0.050 | 0.40         | 10 |
| 4435     | Holt         | 13.320     | 0.110 | 0.230      | 0.000            | 13.20            | 0.15              | 13.01             | 0.15             | 13.20            | 0.15                 | -0.120                | -0.310               | -0.120 | 0.00         | 12 |
| 4483     | Petofi       | 13.570     | 0.060 | 0.420      | 0.000            | 13.00            | 0.15              | 13.00             | 0.15             | 11.90            | 0.15                 | -0.570                | -0.570               | -1.670 | 0.98         | 12 |
| 4503     | Cleobulus    | 16.020     | 0.110 | 0.230      | 0.000            | 15.60            | 0.15              | 15.55             | 0.15             | 15.60            | 0.15                 | -0.420                | -0.470               | -0.420 | 0.22         | 12 |
| 4533     | Orth         | 13.140     | 0.094 | 0.370      | 0.100            | 12.80            | 0.15              | 12.63             | 0.15             | 12.80            | 0.15                 | -0.340                | -0.510               | -0.340 | 0.10         | 10 |
| 4555     | 1987 QL      | 14.280     | 0.112 | 0.300      | 0.100            | 13.70            | 0.15              | 13.73             | 0.15             | 13.70            | 0.15                 | -0.580                | -0.550               | -0.580 | 0.22         | 10 |
| 4558     | Janesick     | 12.770     | 0.180 | 0.230      | 0.000            | 12.50            | 0.15              | 12.50             | 0.15             | 12.20            | 0.15                 | -0.270                | -0.270               | -0.570 | 0.11         | 12 |
| 4587     | Rees         | 15.870     | 0.071 | 0.370      | 0.050            | 15.60            | 0.15              | 15.00             | 0.15             | 15.60            | 0.15                 | -0.270                | -0.870               | -0.270 | 0.78         | 10 |
| 4638     | Estens       | 13.950     | 0.071 | 0.240      | 0.110            | 14.00            | 0.15              | 13.52             | 0.15             | 14.00            | 0.15                 | 0.050                 | -0.430               | 0.050  | 0.16         | 10 |



Table 2: *cont.*

| Asteroid |              | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|--------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 4666     | Dietz        | 13.160 | 0.103      | 0.240 | 0.110      | 12.70            | 0.15             | 12.62            | 0.15             | 13.00            | 0.15             | -0.460               | -0.540               | -0.160               | 0.24  | 10           |
| 4674     | Pauling      | 14.245 | 0.114      | 0.330 | 0.100      | 13.30            | 0.15             | 13.63            | 0.15             | 13.30            | 0.15             | -0.945               | -0.615               | -0.945               | 0.06  | 10           |
| 4786     | Tatianina    | 13.718 | 0.100      | 0.460 | 0.100      | 13.20            | 0.15             | 13.15            | 0.15             | 13.20            | 0.15             | -0.518               | -0.568               | -0.518               | 0.19  | 10           |
| 4951     | Iwamoto      | 13.740 | 0.060      | 0.190 | 0.050      | 13.20            | 0.15             | 13.19            | 0.15             | 13.40            | 0.15             | -0.540               | -0.550               | -0.340               | 0.34  | 11           |
| 5080     | Oja          | 13.010 | 0.064      | 0.240 | 0.110      | 12.60            | 0.15             | 12.58            | 0.15             | 12.90            | 0.15             | -0.410               | -0.430               | -0.110               | 0.39  | 10           |
| 5129     | Groom        | 13.060 | 0.103      | 0.160 | 0.090      | 12.60            | 0.15             | 12.52            | 0.15             | 12.40            | 0.15             | -0.460               | -0.540               | -0.660               | 0.21  | 10           |
| 5143     | Heracles     | 14.270 | 0.090      | 0.420 | 0.080      | 13.80            | 0.15             | 13.74            | 0.15             | 14.00            | 0.15             | -0.470               | -0.530               | -0.270               | 0.10  | 6            |
| 5313     | Nunes        | 13.780 | 0.078      | 0.240 | 0.110      | 13.30            | 0.15             | 13.36            | 0.15             | 12.90            | 0.15             | -0.480               | -0.420               | -0.880               | 0.17  | 10           |
| 5332     | Davidaguilar | 14.890 | 0.130      | 0.230 | 0.000      | 14.60            | 0.15             | 14.52            | 0.15             | 13.90            | 0.15             | -0.290               | -0.370               | -0.990               | 0.35  | 12           |
| 5342     | Le Poole     | 14.120 | 0.094      | 0.240 | 0.110      | 13.50            | 0.15             | 13.49            | 0.15             | 13.90            | 0.15             | -0.620               | -0.630               | -0.220               | 0.45  | 10           |
| 5407     | 1992 AX      | 14.470 | 0.050      | 0.320 | 0.070      | 13.70            | 0.15             | 13.69            | 0.15             | 13.90            | 0.15             | -0.770               | -0.780               | -0.570               | 0.10  | 8            |
| 5440     | Terao        | 13.770 | 0.086      | 0.240 | 0.110      | 13.30            | 0.15             | 13.29            | 0.15             | 13.30            | 0.15             | -0.470               | -0.480               | -0.470               | 1.00  | 10           |
| 5451     | Plato        | 14.580 | 0.121      | 0.240 | 0.110      | 14.10            | 0.15             | 13.99            | 0.15             | 14.20            | 0.15             | -0.480               | -0.590               | -0.380               | 0.61  | 10           |
| 5474     | Gingasen     | 13.280 | 0.112      | 0.240 | 0.110      | 12.90            | 0.15             | 12.85            | 0.15             | 12.60            | 0.15             | -0.380               | -0.430               | -0.680               | 0.18  | 10           |
| 5477     | Holmes       | 14.445 | 0.076      | 0.390 | 0.030      | 13.40            | 0.15             | 13.77            | 0.15             | 13.40            | 0.15             | -1.045               | -0.675               | -1.045               | 0.10  | 9            |
| 5481     | Kiuchi       | 13.676 | 0.062      | 0.430 | 0.080      | 13.10            | 0.15             | 13.11            | 0.15             | 13.00            | 0.15             | -0.576               | -0.566               | -0.676               | 0.09  | 10           |
| 5484     | Inoda        | 13.170 | 0.094      | 0.240 | 0.110      | 12.70            | 0.15             | 12.73            | 0.15             | 12.60            | 0.15             | -0.470               | -0.440               | -0.570               | 0.16  | 10           |
| 5580     | Sharidake    | 14.120 | 0.064      | 0.240 | 0.110      | 13.70            | 0.15             | 13.71            | 0.15             | 13.20            | 0.15             | -0.420               | -0.410               | -0.920               | 0.37  | 10           |
| 5645     | 1990 SP      | 17.240 | 0.206      | 0.000 | 0.100      | 16.80            | 0.15             | 16.64            | 0.15             | 17.00            | 0.15             | -0.440               | -0.600               | -0.240               | 0.72  | 10           |
| 5653     | Camarillo    | 16.420 | 0.130      | 0.240 | 0.110      | 16.10            | 0.15             | 16.04            | 0.15             | 15.40            | 0.15             | -0.320               | -0.380               | -1.020               | 0.40  | 10           |
| 5693     | 1993 EA      | 16.870 | 0.070      | 0.230 | 0.000      | 17.00            | 0.15             | 16.50            | 0.15             | 17.00            | 0.15             | 0.130                | -0.370               | 0.130                | 0.11  | 12           |
| 5736     | Sanford      | 14.170 | 0.177      | 0.240 | 0.110      | 13.60            | 0.15             | 13.57            | 0.15             | 13.40            | 0.15             | -0.570               | -0.600               | -0.770               | 0.42  | 10           |
| 5751     | Zao          | 14.940 | 0.180      | 0.230 | 0.000      | 14.60            | 0.15             | 14.50            | 0.15             | 14.80            | 0.15             | -0.340               | -0.440               | -0.140               | 0.04  | 12           |
| 5783     | Kumagaya     | 13.810 | 0.064      | 0.240 | 0.110      | 13.30            | 0.15             | 13.27            | 0.15             | 13.10            | 0.15             | -0.510               | -0.540               | -0.710               | 0.22  | 10           |
| 5786     | Talos        | 17.360 | 0.139      | 0.240 | 0.110      | 17.10            | 0.15             | 16.97            | 0.15             | 17.00            | 0.15             | -0.260               | -0.390               | -0.360               | 0.23  | 10           |
| 5797     | Bivoj        | 18.940 | 0.020      | 0.230 | 0.110      | 18.70            | 0.15             | 18.64            | 0.15             | 19.10            | 0.15             | -0.240               | -0.300               | 0.160                | 0.12  | 1            |
| 5836     | 1993 MF      | 15.141 | 0.139      | 0.236 | 0.000      | 14.60            | 0.15             | 14.46            | 0.15             | 13.90            | 0.15             | -0.541               | -0.681               | -1.241               | 0.65  | 10, 12       |
| 5905     | Johnson      | 14.255 | 0.130      | 0.330 | 0.100      | 14.00            | 0.15             | 13.84            | 0.15             | 13.20            | 0.15             | -0.255               | -0.415               | -1.055               | 0.09  | 10           |
| 5985     | 1942 RJ      | 13.530 | 0.086      | 0.240 | 0.110      | 13.10            | 0.15             | 13.23            | 0.15             | 13.10            | 0.15             | -0.430               | -0.300               | -0.430               | 0.14  | 10           |
| 5999     | Plescia      | 14.800 | 0.158      | 0.240 | 0.110      | 14.30            | 0.15             | 14.23            | 0.15             | 14.30            | 0.15             | -0.500               | -0.570               | -0.500               | 0.69  | 10           |
| 6070     | Rheinland    | 14.170 | 0.054      | 0.310 | 0.030      | 13.60            | 0.15             | 13.68            | 0.15             | 13.60            | 0.15             | -0.570               | -0.490               | -0.570               | 0.40  | 10           |
| 6084     | Bascom       | 13.290 | 0.058      | 0.260 | 0.050      | 12.70            | 0.15             | 12.68            | 0.15             | 12.80            | 0.15             | -0.590               | -0.610               | -0.490               | 0.22  | 10           |
| 6178     | 1986 DA      | 15.900 | 0.112      | 0.200 | 0.070      | 15.10            | 0.15             | 15.36            | 0.15             | 15.10            | 0.15             | -0.800               | -0.540               | -0.800               | 0.30  | 10           |
| 6179     | Brett        | 14.160 | 0.139      | 0.240 | 0.110      | 13.40            | 0.15             | 13.32            | 0.15             | 13.70            | 0.15             | -0.760               | -0.840               | -0.460               | 0.70  | 10           |
| 6185     | 1987 YD      | 13.480 | 0.086      | 0.240 | 0.110      | 13.20            | 0.15             | 12.99            | 0.15             | 13.20            | 0.15             | -0.280               | -0.490               | -0.280               | 0.33  | 10           |
| 6239     | Minos        | 18.740 | 0.094      | 0.240 | 0.050      | 18.20            | 0.15             | 18.30            | 0.15             | 17.90            | 0.15             | -0.540               | -0.440               | -0.840               | 0.08  | 10           |
| 6244     | Okamoto      | 13.900 | 0.064      | 0.280 | 0.040      | 13.60            | 0.15             | 13.44            | 0.15             | 13.60            | 0.15             | -0.300               | -0.460               | -0.300               | 0.11  | 10           |
| 6361     | 1978 VL11    | 13.860 | 0.071      | 0.240 | 0.110      | 13.10            | 0.15             | 13.12            | 0.15             | 12.20            | 0.15             | -0.760               | -0.740               | -1.660               | 0.67  | 10           |
| 6405     | Komiyama     | 13.430 | 0.112      | 0.240 | 0.110      | 13.10            | 0.15             | 13.00            | 0.15             | 13.20            | 0.15             | -0.330               | -0.430               | -0.230               | 0.13  | 10           |
| 6453     | 1991 NY      | 13.810 | 0.112      | 0.240 | 0.110      | 13.60            | 0.15             | 13.56            | 0.15             | 13.60            | 0.15             | -0.210               | -0.250               | -0.210               | 0.20  | 10           |
| 6455     | 1992 HE      | 14.215 | 0.112      | 0.340 | 0.100      | 13.90            | 0.15             | 13.71            | 0.15             | 13.80            | 0.15             | -0.315               | -0.505               | -0.415               | 0.10  | 10           |
| 6456     | Golombek     | 16.030 | 0.103      | 0.120 | 0.080      | 15.80            | 0.15             | 15.75            | 0.15             | 15.90            | 0.15             | -0.230               | -0.280               | -0.130               | 0.13  | 10           |
| 6611     | 1993 VW      | 17.256 | 0.097      | 0.430 | 0.080      | 16.70            | 0.15             | 16.65            | 0.15             | 16.50            | 0.15             | -0.556               | -0.606               | -0.756               | 0.06  | 10           |
| 6708     | Bobbievaile  | 13.290 | 0.064      | 0.240 | 0.040      | 12.90            | 0.15             | 12.93            | 0.15             | 12.80            | 0.15             | -0.390               | -0.360               | -0.490               | 0.09  | 10           |

Table 2: *cont.*

| Asteroid           | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|--------------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 6815 Mutchler      | 14.990 | 0.058      | 0.240 | 0.110      | 14.50            | 0.15             | 14.49            | 0.15             | 14.20            | 0.15             | -0.490               | -0.500               | -0.790               | 0.09  | 10           |
| 6949 Zissell       | 14.000 | 0.121      | 0.240 | 0.110      | 13.50            | 0.15             | 13.42            | 0.15             | 13.10            | 0.15             | -0.500               | -0.580               | -0.900               | 0.24  | 10           |
| 7020 Yourcenar     | 14.290 | 0.112      | 0.240 | 0.110      | 13.70            | 0.15             | 13.89            | 0.15             | 13.70            | 0.15             | -0.590               | -0.400               | -0.590               | 0.37  | 10           |
| 7030 Colombini     | 14.480 | 0.094      | 0.240 | 0.110      | 13.90            | 0.15             | 13.62            | 0.15             | 13.90            | 0.15             | -0.580               | -0.860               | -0.580               | 0.47  | 10           |
| 7033 1994 WN2      | 14.000 | 0.112      | 0.240 | 0.110      | 13.60            | 0.15             | 13.55            | 0.15             | 13.30            | 0.15             | -0.400               | -0.450               | -0.700               | 0.10  | 10           |
| 7043 Godart        | 13.490 | 0.078      | 0.330 | 0.150      | 13.00            | 0.15             | 13.05            | 0.15             | 12.80            | 0.15             | -0.490               | -0.440               | -0.690               | 0.68  | 10           |
| 7088 Ishtar        | 17.080 | 0.139      | 0.240 | 0.110      | 16.70            | 0.15             | 16.57            | 0.15             | 16.70            | 0.15             | -0.380               | -0.510               | -0.380               | 0.11  | 10           |
| 7089 1992 FX1      | 14.050 | 0.086      | 0.240 | 0.110      | 13.50            | 0.15             | 13.41            | 0.15             | 13.70            | 0.15             | -0.550               | -0.640               | -0.350               | 0.06  | 10           |
| 7116 Mentall       | 13.540 | 0.078      | 0.240 | 0.110      | 13.10            | 0.15             | 13.12            | 0.15             | 13.50            | 0.15             | -0.440               | -0.420               | -0.040               | 0.11  | 10           |
| 7225 Huntress      | 13.490 | 0.058      | 0.360 | 0.100      | 13.00            | 0.15             | 12.99            | 0.15             | 13.30            | 0.15             | -0.490               | -0.500               | -0.190               | 0.11  | 10           |
| 7229 Tonimooore    | 15.600 | 0.200      | 0.230 | 0.000      | 15.30            | 0.15             | 15.03            | 0.15             | 15.60            | 0.15             | -0.300               | -0.570               | 0.000                | 0.37  | 12           |
| 7267 Victormeen    | 13.930 | 0.139      | 0.240 | 0.110      | 13.60            | 0.15             | 13.57            | 0.15             | 13.50            | 0.15             | -0.330               | -0.360               | -0.430               | 0.20  | 10           |
| 7336 Saunders      | 19.020 | 0.112      | 0.240 | 0.110      | 18.80            | 0.15             | 18.75            | 0.15             | 18.70            | 0.15             | -0.220               | -0.270               | -0.320               | 0.20  | 10           |
| 7341 1991 VK       | 16.950 | 0.200      | 0.260 | 0.140      | 16.70            | 0.15             | 16.66            | 0.15             | 16.70            | 0.15             | -0.250               | -0.290               | -0.250               | 0.49  | 6            |
| 7369 Gavrilin      | 13.610 | 0.158      | 0.200 | 0.150      | 13.10            | 0.15             | 13.06            | 0.15             | 12.90            | 0.15             | -0.510               | -0.550               | -0.710               | 0.25  | 10           |
| 7480 Norwan        | 17.450 | 0.160      | 0.230 | 0.110      | 17.00            | 0.15             | 16.89            | 0.15             | 17.20            | 0.15             | -0.450               | -0.560               | -0.250               | 0.50  | 6            |
| 7481 San Marcello  | 12.540 | 0.112      | 0.120 | 0.080      | 12.30            | 0.15             | 12.33            | 0.15             | 11.80            | 0.15             | -0.240               | -0.210               | -0.740               | 0.08  | 10           |
| 7735 Scorzelli     | 13.100 | 0.206      | 0.120 | 0.080      | 12.30            | 0.15             | 12.86            | 0.15             | 12.30            | 0.15             | -0.800               | -0.240               | -0.800               | 0.84  | 10           |
| 7977 1977 QQ5      | 15.600 | 0.139      | 0.240 | 0.110      | 15.40            | 0.15             | 15.02            | 0.15             | 15.40            | 0.15             | -0.200               | -0.580               | -0.200               | 0.57  | 10           |
| 8013 Gordonmoore   | 17.260 | 0.149      | 0.235 | 0.000      | 16.60            | 0.15             | 16.67            | 0.15             | 16.60            | 0.15             | -0.660               | -0.590               | -0.660               | 0.20  | 10, 12       |
| 8033 1992 FY1      | 13.640 | 0.071      | 0.240 | 0.110      | 13.20            | 0.15             | 13.16            | 0.15             | 13.40            | 0.15             | -0.440               | -0.480               | -0.240               | 0.14  | 10           |
| 8034 Akka          | 18.148 | 0.110      | 0.230 | 0.000      | 17.90            | 0.15             | 17.79            | 0.15             | 17.90            | 0.15             | -0.248               | -0.358               | -0.248               | 0.47  | 6, 12        |
| 8037 1993 HO1      | 16.710 | 0.064      | 0.240 | 0.110      | 16.20            | 0.15             | 16.20            | 0.15             | 16.60            | 0.15             | -0.510               | -0.510               | -0.110               | 0.10  | 10           |
| 8116 Jeanperrin    | 14.050 | 0.050      | 0.230 | 0.060      | 13.60            | 0.15             | 13.61            | 0.15             | 13.80            | 0.15             | -0.450               | -0.440               | -0.250               | 0.09  | 10           |
| 8195 1993 UC1      | 12.900 | 0.094      | 0.240 | 0.110      | 12.70            | 0.15             | 12.47            | 0.15             | 12.70            | 0.15             | -0.200               | -0.430               | -0.200               | 0.33  | 10           |
| 8338 Ralhan        | 14.020 | 0.086      | 0.240 | 0.110      | 13.50            | 0.15             | 13.47            | 0.15             | 13.40            | 0.15             | -0.520               | -0.550               | -0.620               | 0.44  | 10           |
| 8356 Wadhwa        | 13.070 | 0.139      | 0.240 | 0.110      | 12.80            | 0.15             | 12.81            | 0.15             | 12.80            | 0.15             | -0.270               | -0.260               | -0.270               | 0.12  | 10           |
| 8567 1996 HW1      | 15.270 | 0.149      | 0.240 | 0.110      | 15.30            | 0.15             | 15.30            | 0.15             | 15.30            | 0.15             | 0.030                | 0.030                | 0.030                | 0.25  | 10           |
| 8663 1991 DJ1      | 14.100 | 0.086      | 0.240 | 0.110      | 13.70            | 0.15             | 13.59            | 0.15             | 14.00            | 0.15             | -0.400               | -0.510               | -0.100               | 0.30  | 10           |
| 9260 Edwardolson   | 14.540 | 0.086      | 0.240 | 0.110      | 14.00            | 0.15             | 13.94            | 0.15             | 14.70            | 0.15             | -0.540               | -0.600               | 0.160                | 0.11  | 10           |
| 9556 Gaywray       | 13.710 | 0.206      | 0.240 | 0.110      | 13.10            | 0.15             | 13.10            | 0.15             | 13.40            | 0.15             | -0.610               | -0.610               | -0.310               | 0.50  | 10           |
| 9617 Grahamchapman | 14.970 | 0.078      | 0.240 | 0.110      | 14.60            | 0.15             | 14.46            | 0.15             | 14.10            | 0.15             | -0.370               | -0.510               | -0.870               | 0.10  | 10           |
| 9782 Edo           | 13.480 | 0.103      | 0.240 | 0.110      | 13.10            | 0.15             | 13.01            | 0.15             | 13.40            | 0.15             | -0.380               | -0.470               | -0.080               | 0.67  | 10           |
| 9948 1990 QB2      | 14.620 | 0.058      | 0.240 | 0.110      | 14.50            | 0.15             | 14.13            | 0.15             | 14.50            | 0.15             | -0.120               | -0.490               | -0.120               | 0.74  | 10           |
| 9992 1997 TG19     | 14.970 | 0.094      | 0.240 | 0.110      | 14.40            | 0.15             | 14.38            | 0.15             | 14.40            | 0.15             | -0.570               | -0.590               | -0.570               | 0.42  | 10           |
| 10123 Fideoja      | 14.530 | 0.078      | 0.240 | 0.110      | 14.20            | 0.15             | 14.06            | 0.15             | 13.80            | 0.15             | -0.330               | -0.470               | -0.730               | 0.00  | 10           |
| 10188 Yasuoyoneda  | 14.030 | 0.121      | 0.240 | 0.110      | 13.60            | 0.15             | 13.56            | 0.15             | 14.20            | 0.15             | -0.430               | -0.470               | 0.170                | 0.12  | 10           |
| 10208 Germanicus   | 14.790 | 0.139      | 0.240 | 0.110      | 14.30            | 0.15             | 14.32            | 0.15             | 14.60            | 0.15             | -0.490               | -0.470               | -0.190               | 0.13  | 10           |
| 10484 Hecht        | 14.180 | 0.103      | 0.240 | 0.110      | 13.80            | 0.15             | 13.72            | 0.15             | 13.90            | 0.15             | -0.380               | -0.460               | -0.280               | 0.20  | 10           |
| 10548 1992 PJ2     | 14.750 | 0.139      | 0.240 | 0.110      | 14.50            | 0.15             | 14.34            | 0.15             | 14.50            | 0.15             | -0.250               | -0.410               | -0.250               | 0.34  | 10           |
| 11072 Hiraoka      | 13.720 | 0.094      | 0.240 | 0.110      | 13.30            | 0.15             | 13.16            | 0.15             | 13.50            | 0.15             | -0.420               | -0.560               | -0.220               | 0.26  | 10           |
| 11271 1988 KB      | 13.170 | 0.139      | 0.240 | 0.110      | 12.80            | 0.15             | 12.77            | 0.15             | 13.60            | 0.15             | -0.370               | -0.400               | 0.430                | 0.35  | 10           |
| 11398 1998 YP11    | 16.590 | 0.058      | 0.290 | 0.020      | 16.40            | 0.15             | 16.38            | 0.15             | 16.30            | 0.15             | -0.190               | -0.210               | -0.290               | 0.25  | 10           |
| 11500 Tomaiyowit   | 18.490 | 0.112      | 0.190 | 0.050      | 18.40            | 0.15             | 18.27            | 0.15             | 18.40            | 0.15             | -0.090               | -0.220               | -0.090               | 0.50  | 10           |

Table 2: *cont.*

| Asteroid |            | $H$    | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|------------|--------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 11756    | Geneparker | 15.020 | 0.078      | 0.240  | 0.110      | 14.60            | 0.15             | 14.58            | 0.15             | 15.10            | 0.15             | -0.420               | -0.440               | 0.080                | 0.14  | 10           |
| 12466    | 1997 AS12  | 14.210 | 0.094      | 0.240  | 0.110      | 13.80            | 0.15             | 13.70            | 0.15             | 13.70            | 0.15             | -0.410               | -0.510               | -0.510               | 0.06  | 10           |
| 12711    | Tukmit     | 16.240 | 0.078      | 0.250  | 0.050      | 15.80            | 0.15             | 15.69            | 0.15             | 16.00            | 0.15             | -0.440               | -0.550               | -0.240               | 0.70  | 10           |
| 12923    | Zephyr     | 15.930 | 0.078      | 0.240  | 0.110      | 15.70            | 0.15             | 15.68            | 0.15             | 16.10            | 0.15             | -0.230               | -0.250               | 0.170                | 0.18  | 10           |
| 13144    | 1995 BJ    | 13.400 | 0.112      | 0.120  | 0.080      | 13.10            | 0.15             | 13.15            | 0.15             | 13.30            | 0.15             | -0.300               | -0.250               | -0.100               | 0.19  | 10           |
| 13154    | Petermrva  | 14.600 | 0.058      | 0.200  | 0.100      | 14.10            | 0.15             | 14.07            | 0.15             | 14.20            | 0.15             | -0.500               | -0.530               | -0.400               | 0.14  | 10           |
| 13166    | 1995 WU1   | 12.950 | 0.094      | 0.240  | 0.110      | 12.30            | 0.15             | 12.45            | 0.15             | 12.30            | 0.15             | -0.650               | -0.500               | -0.650               | 0.22  | 10           |
| 13553    | 1992 JE    | 16.710 | 0.130      | 0.240  | 0.110      | 16.00            | 0.15             | 16.29            | 0.15             | 16.00            | 0.15             | -0.710               | -0.420               | -0.710               | 1.10  | 10           |
| 13651    | 1997 BR    | 18.050 | 0.150      | 0.080  | 0.090      | 17.60            | 0.15             | 17.56            | 0.15             | 17.60            | 0.15             | -0.450               | -0.490               | -0.450               | 1.20  | 6            |
| 14211    | 1999 NT1   | 14.220 | 0.149      | 0.240  | 0.110      | 13.70            | 0.15             | 13.68            | 0.15             | 13.70            | 0.15             | -0.520               | -0.540               | -0.520               | 0.12  | 10           |
| 14402    | 1991 DB    | 19.040 | 0.054      | 0.260  | 0.030      | 18.40            | 0.15             | 18.53            | 0.15             | 18.40            | 0.15             | -0.640               | -0.510               | -0.640               | 0.11  | 10           |
| 15350    | Naganuma   | 14.160 | 0.103      | 0.240  | 0.110      | 13.90            | 0.15             | 13.94            | 0.15             | 13.90            | 0.15             | -0.260               | -0.220               | -0.260               | 0.07  | 10           |
| 15533    | 2000 AP138 | 14.180 | 0.103      | 0.240  | 0.110      | 13.60            | 0.15             | 13.59            | 0.15             | 13.60            | 0.15             | -0.580               | -0.590               | -0.580               | 0.38  | 10           |
| 15700    | 1987 QD    | 14.990 | 0.086      | 0.240  | 0.110      | 14.40            | 0.15             | 14.43            | 0.15             | 14.40            | 0.15             | -0.590               | -0.560               | -0.590               | 0.07  | 10           |
| 15702    | Olegkotov  | 13.210 | 0.064      | 0.120  | 0.080      | 12.90            | 0.15             | 12.91            | 0.15             | 13.50            | 0.15             | -0.310               | -0.300               | 0.290                | 0.05  | 10           |
| 15793    | 1993 TG19  | 15.460 | 0.206      | 0.240  | 0.110      | 14.70            | 0.15             | 14.73            | 0.15             | 15.10            | 0.15             | -0.760               | -0.730               | -0.360               | 0.71  | 10           |
| 16064    | 1999 RH27  | 16.560 | 0.064      | -0.140 | 0.020      | 16.80            | 0.15             | 16.66            | 0.15             | 16.90            | 0.15             | 0.240                | 0.100                | 0.340                | 0.70  | 10           |
| 16115    | 1999 XH25  | 13.280 | 0.094      | 0.120  | 0.080      | 13.00            | 0.15             | 12.97            | 0.15             | 13.30            | 0.15             | -0.280               | -0.310               | 0.020                | 0.26  | 10           |
| 16173    | 2000 AC98  | 14.430 | 0.058      | 0.270  | 0.050      | 14.00            | 0.15             | 13.90            | 0.15             | 13.80            | 0.15             | -0.430               | -0.530               | -0.630               | 0.36  | 10           |
| 16403    | 1984 WJ1   | 13.740 | 0.064      | 0.370  | 0.050      | 12.70            | 0.15             | 13.30            | 0.15             | 12.70            | 0.15             | -1.040               | -0.440               | -1.040               | 0.14  | 10           |
| 16691    | 1994 VS    | 15.010 | 0.206      | 0.240  | 0.110      | 14.50            | 0.15             | 14.40            | 0.15             | 15.00            | 0.15             | -0.510               | -0.610               | -0.010               | 0.25  | 10           |
| 17060    | Mikecombi  | 14.020 | 0.130      | 0.240  | 0.110      | 13.40            | 0.15             | 13.38            | 0.15             | 13.60            | 0.15             | -0.620               | -0.640               | -0.420               | 0.33  | 10           |
| 17260    | 2000 JQ58  | 14.580 | 0.112      | 0.160  | 0.120      | 14.20            | 0.15             | 14.16            | 0.15             | 14.00            | 0.15             | -0.380               | -0.420               | -0.580               | 0.15  | 9            |
| 17470    | 1991 BX    | 13.280 | 0.112      | 0.120  | 0.080      | 13.10            | 0.15             | 12.99            | 0.15             | 12.60            | 0.15             | -0.180               | -0.290               | -0.680               | 0.68  | 10           |
| 17479    | 1991 PV9   | 13.640 | 0.071      | 0.240  | 0.110      | 13.20            | 0.15             | 13.13            | 0.15             | 13.20            | 0.15             | -0.440               | -0.510               | -0.440               | 0.31  | 10           |
| 17938    | Tamsendrew | 14.870 | 0.121      | 0.240  | 0.110      | 14.40            | 0.15             | 14.38            | 0.15             | 14.80            | 0.15             | -0.470               | -0.490               | -0.070               | 0.17  | 10           |
| 18096    | 2000 LM16  | 13.960 | 0.206      | 0.120  | 0.080      | 13.70            | 0.15             | 13.58            | 0.15             | 13.80            | 0.15             | -0.260               | -0.380               | -0.160               | 0.18  | 10           |
| 18109    | 2000 NG11  | 17.180 | 0.206      | 0.040  | 0.100      | 17.50            | 0.15             | 16.91            | 0.15             | 17.50            | 0.15             | 0.320                | -0.270               | 0.320                | 1.13  | 10           |
| 18503    | 1996 PY4   | 14.510 | 0.158      | 0.240  | 0.110      | 13.90            | 0.15             | 13.85            | 0.15             | 14.80            | 0.15             | -0.610               | -0.660               | 0.290                | 0.25  | 10           |
| 19763    | Klimesh    | 13.270 | 0.130      | 0.240  | 0.110      | 12.80            | 0.15             | 12.72            | 0.15             | 13.20            | 0.15             | -0.470               | -0.550               | -0.070               | 0.67  | 10           |
| 19764    | 2000 NF5   | 16.280 | 0.078      | 0.300  | 0.100      | 15.90            | 0.15             | 15.81            | 0.15             | 16.00            | 0.15             | -0.380               | -0.470               | -0.280               | 0.80  | 10           |
| 20031    | 1992 OO    | 13.850 | 0.121      | 0.240  | 0.110      | 13.20            | 0.15             | 13.12            | 0.15             | 12.90            | 0.15             | -0.650               | -0.730               | -0.950               | 0.39  | 10           |
| 20236    | 1998 BZ7   | 17.930 | 0.149      | 0.240  | 0.110      | 17.60            | 0.15             | 17.56            | 0.15             | 17.60            | 0.15             | -0.330               | -0.370               | -0.330               | 0.17  | 10           |
| 20255    | 1998 FX2   | 18.370 | 0.110      | 0.240  | 0.110      | 18.20            | 0.15             | 18.27            | 0.15             | 18.20            | 0.15             | -0.170               | -0.100               | -0.170               | 0.17  | 10           |
| 20429    | 1998 YN1   | 17.980 | 0.121      | 0.240  | 0.110      | 17.60            | 0.15             | 17.29            | 0.15             | 18.00            | 0.15             | -0.380               | -0.690               | 0.020                | 0.15  | 10           |
| 20691    | 1999 VY72  | 13.690 | 0.112      | 0.240  | 0.110      | 13.20            | 0.15             | 13.15            | 0.15             | 13.20            | 0.15             | -0.490               | -0.540               | -0.490               | 0.13  | 10           |
| 20932    | 2258 T-1   | 13.780 | 0.078      | 0.240  | 0.110      | 13.30            | 0.15             | 13.24            | 0.15             | 13.20            | 0.15             | -0.480               | -0.540               | -0.580               | 0.17  | 10           |
| 21028    | 1989 TO    | 13.290 | 0.158      | 0.240  | 0.110      | 13.60            | 0.15             | 13.07            | 0.15             | 13.60            | 0.15             | 0.310                | -0.220               | 0.310                | 0.12  | 10           |
| 21088    | 1992 BL2   | 14.350 | 0.149      | 0.240  | 0.110      | 14.20            | 0.15             | 14.14            | 0.15             | 14.40            | 0.15             | -0.150               | -0.210               | 0.050                | 0.13  | 10           |
| 21720    | Pilishvili | 15.140 | 0.071      | 0.240  | 0.110      | 14.70            | 0.15             | 14.69            | 0.15             | 15.30            | 0.15             | -0.440               | -0.450               | 0.160                | 0.14  | 10           |
| 22166    | 2000 WX154 | 15.020 | 0.103      | 0.240  | 0.110      | 14.40            | 0.15             | 14.13            | 0.15             | 14.60            | 0.15             | -0.620               | -0.890               | -0.420               | 0.46  | 10           |
| 23809    | Haswell    | 14.970 | 0.064      | 0.240  | 0.110      | 14.40            | 0.15             | 14.32            | 0.15             | 15.00            | 0.15             | -0.570               | -0.650               | 0.030                | 0.16  | 10           |
| 23971    | 1998 YU9   | 14.570 | 0.086      | 0.120  | 0.080      | 13.70            | 0.15             | 13.53            | 0.15             | 13.60            | 0.15             | -0.870               | -1.040               | -0.970               | 0.79  | 10           |
| 23979    | 1999 JL82  | 13.900 | 0.078      | 0.240  | 0.110      | 13.50            | 0.15             | 13.27            | 0.15             | 13.50            | 0.15             | -0.400               | -0.630               | -0.400               | 0.17  | 10           |

Table 2: *cont.*

| Asteroid |               | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{A\&D}}$ | $G_{\text{A\&D}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{A\&D}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|---------------|--------|------------|-------|------------|------------------|------------------|-------------------|-------------------|------------------|------------------|----------------------|-----------------------|----------------------|-------|--------------|
| 24114    | 1999 VV23     | 13.520 | 0.130      | 0.240 | 0.110      | 13.10            | 0.15             | 13.21             | 0.15              | 13.10            | 0.15             | -0.420               | -0.310                | -0.420               | 0.26  | 10           |
| 24891    | 1997 AT2      | 15.690 | 0.071      | 0.240 | 0.110      | 15.20            | 0.15             | 15.14             | 0.15              | 15.00            | 0.15             | -0.490               | -0.550                | -0.690               | 0.96  | 10           |
| 25330    | 1999 KV4      | 16.730 | 0.146      | 0.120 | 0.080      | 16.60            | 0.15             | 16.48             | 0.15              | 16.80            | 0.15             | -0.130               | -0.250                | 0.070                | 0.15  | 10           |
| 25355    | 1999 RU221    | 15.590 | 0.103      | 0.240 | 0.110      | 14.80            | 0.15             | 14.88             | 0.15              | 15.20            | 0.15             | -0.790               | -0.710                | -0.390               | 0.79  | 10           |
| 25458    | 1999 XT13     | 14.770 | 0.112      | 0.240 | 0.110      | 14.20            | 0.15             | 14.19             | 0.15              | 13.90            | 0.15             | -0.570               | -0.580                | -0.870               | 0.30  | 10           |
| 25719    | 2000 AV171    | 14.190 | 0.112      | 0.120 | 0.080      | 13.60            | 0.15             | 13.62             | 0.15              | 13.80            | 0.15             | -0.590               | -0.570                | -0.390               | 0.82  | 10           |
| 26045    | 1582 T-2      | 15.840 | 0.112      | 0.240 | 0.110      | 15.50            | 0.15             | 15.44             | 0.15              | 15.80            | 0.15             | -0.340               | -0.400                | -0.040               | 0.10  | 10           |
| 26760    | 2001 KP41     | 15.580 | 0.112      | 0.050 | 0.050      | 15.30            | 0.15             | 15.27             | 0.15              | 15.50            | 0.15             | -0.280               | -0.310                | -0.080               | 0.31  | 10           |
| 26879    | Haines        | 14.580 | 0.103      | 0.240 | 0.110      | 14.20            | 0.15             | 13.99             | 0.15              | 14.40            | 0.15             | -0.380               | -0.590                | -0.180               | 0.07  | 10           |
| 27695    | 1981 EW36     | 15.150 | 0.078      | 0.120 | 0.080      | 15.00            | 0.15             | 14.86             | 0.15              | 15.10            | 0.15             | -0.150               | -0.290                | -0.050               | 0.15  | 10           |
| 28017    | 1997 YV13     | 13.910 | 0.094      | 0.240 | 0.110      | 13.20            | 0.15             | 13.46             | 0.15              | 13.20            | 0.15             | -0.710               | -0.450                | -0.710               | 0.15  | 10           |
| 29168    | 1990 KJ       | 13.840 | 0.130      | 0.240 | 0.110      | 13.30            | 0.15             | 13.27             | 0.15              | 13.40            | 0.15             | -0.540               | -0.570                | -0.440               | 0.14  | 10           |
| 29292    | Conniewalker  | 13.590 | 0.112      | 0.240 | 0.110      | 13.40            | 0.15             | 13.34             | 0.15              | 13.40            | 0.15             | -0.190               | -0.250                | -0.190               | 0.63  | 10           |
| 30825    | 1990 TG1      | 14.920 | 0.139      | 0.240 | 0.110      | 14.80            | 0.15             | 14.64             | 0.15              | 14.70            | 0.15             | -0.120               | -0.280                | -0.220               | 0.11  | 10           |
| 31345    | 1998 PG       | 17.640 | 0.140      | 0.230 | 0.110      | 17.30            | 0.15             | 17.12             | 0.15              | 17.30            | 0.15             | -0.340               | -0.520                | -0.340               | 0.11  | 7            |
| 31650    | Frydek-Mistek | 14.230 | 0.112      | 0.120 | 0.080      | 13.80            | 0.15             | 13.78             | 0.15              | 13.90            | 0.15             | -0.430               | -0.450                | -0.330               | 0.19  | 10           |
| 32008    | 2000 HM53     | 14.730 | 0.103      | 0.240 | 0.110      | 14.30            | 0.15             | 14.25             | 0.15              | 14.10            | 0.15             | -0.430               | -0.480                | -0.630               | 0.19  | 10           |
| 32039    | 2000 JO23     | 14.870 | 0.058      | 0.250 | 0.030      | 14.40            | 0.15             | 14.41             | 0.15              | 14.80            | 0.15             | -0.470               | -0.460                | -0.070               | 0.05  | 10           |
| 32910    | 1994 TE15     | 15.340 | 0.086      | 0.300 | 0.100      | 14.50            | 0.15             | 14.79             | 0.15              | 14.50            | 0.15             | -0.840               | -0.550                | -0.840               | 0.16  | 10           |
| 32953    | 1996 GF19     | 15.030 | 0.064      | 0.240 | 0.110      | 14.70            | 0.15             | 14.57             | 0.15              | 14.70            | 0.15             | -0.330               | -0.460                | -0.330               | 0.07  | 10           |
| 33788    | 1999 RL240    | 13.180 | 0.206      | 0.120 | 0.080      | 12.80            | 0.15             | 12.80             | 0.15              | 13.10            | 0.15             | -0.380               | -0.380                | -0.080               | 0.44  | 10           |
| 34442    | 2000 SS64     | 14.540 | 0.064      | 0.120 | 0.080      | 14.30            | 0.15             | 14.19             | 0.15              | 14.00            | 0.15             | -0.240               | -0.350                | -0.540               | 0.83  | 10           |
| 34706    | 2001 OP83     | 15.070 | 0.139      | 0.240 | 0.110      | 14.70            | 0.15             | 14.74             | 0.15              | 14.70            | 0.15             | -0.370               | -0.330                | -0.370               | 0.13  | 10           |
| 35107    | 1991 VH       | 16.980 | 0.050      | 0.280 | 0.030      | 16.90            | 0.15             | 16.69             | 0.15              | 16.90            | 0.15             | -0.080               | -0.290                | -0.080               | 0.08  | 8            |
| 35389    | 1997 XO       | 14.690 | 0.112      | 0.120 | 0.080      | 14.40            | 0.15             | 14.29             | 0.15              | 14.30            | 0.15             | -0.290               | -0.400                | -0.390               | 0.18  | 10           |
| 35396    | 1997 XF11     | 16.770 | 0.080      | 0.060 | 0.040      | 16.90            | 0.15             | 16.70             | 0.15              | 16.90            | 0.15             | 0.130                | -0.070                | 0.130                | 0.73  | 10           |
| 35430    | 1998 BT6      | 15.690 | 0.086      | 0.240 | 0.110      | 15.20            | 0.15             | 15.09             | 0.15              | 15.50            | 0.15             | -0.490               | -0.600                | -0.190               | 0.82  | 10           |
| 36368    | 2000 OG12     | 15.510 | 0.112      | 0.240 | 0.110      | 15.00            | 0.15             | 15.01             | 0.15              | 15.30            | 0.15             | -0.510               | -0.500                | -0.210               | 0.00  | 10           |
| 36492    | 2000 QW46     | 15.045 | 0.164      | 0.240 | 0.110      | 14.50            | 0.15             | 14.37             | 0.15              | 14.50            | 0.15             | -0.545               | -0.675                | -0.545               | 0.00  | 10           |
| 37655    | Illapa        | 18.010 | 0.158      | 0.240 | 0.110      | 17.90            | 0.15             | 17.75             | 0.15              | 17.70            | 0.15             | -0.110               | -0.260                | -0.310               | 0.11  | 10           |
| 38995    | 2000 UJ24     | 14.770 | 0.112      | 0.120 | 0.080      | 14.50            | 0.15             | 14.43             | 0.15              | 14.40            | 0.15             | -0.270               | -0.340                | -0.370               | 0.31  | 10           |
| 39076    | 2000 VL22     | 15.205 | 0.141      | 0.120 | 0.080      | 14.70            | 0.15             | 14.69             | 0.15              | 14.70            | 0.15             | -0.505               | -0.515                | -0.505               | 0.35  | 10           |
| 39783    | 1997 LB1      | 14.020 | 0.112      | 0.120 | 0.080      | 13.70            | 0.15             | 13.64             | 0.15              | 13.70            | 0.15             | -0.320               | -0.380                | -0.320               | 0.36  | 10           |
| 40267    | 1999 GJ4      | 16.080 | 0.206      | 0.500 | 0.200      | 15.40            | 0.15             | 15.28             | 0.15              | 15.25            | 0.15             | -0.680               | -0.800                | -0.830               | 1.01  | 10           |
| 42314    | 2001 VQ121    | 14.660 | 0.206      | 0.120 | 0.080      | 14.30            | 0.15             | 14.08             | 0.15              | 14.30            | 0.15             | -0.360               | -0.580                | -0.360               | 1.00  | 10           |
| 43183    | 1999 XK213    | 14.340 | 0.112      | 0.120 | 0.080      | 14.00            | 0.15             | 14.02             | 0.15              | 14.00            | 0.15             | -0.340               | -0.320                | -0.340               | 0.46  | 10           |
| 45810    | 2000 QP32     | 15.320 | 0.112      | 0.240 | 0.110      | 14.90            | 0.15             | 14.72             | 0.15              | 14.90            | 0.15             | -0.420               | -0.600                | -0.420               | 0.16  | 10           |
| 46824    | 1998 MT38     | 15.900 | 0.112      | 0.240 | 0.110      | 15.40            | 0.15             | 15.17             | 0.15              | 15.40            | 0.15             | -0.500               | -0.730                | -0.500               | 0.00  | 10           |
| 50822    | 2000 FH35     | 14.620 | 0.058      | 0.120 | 0.080      | 14.30            | 0.15             | 14.21             | 0.15              | 14.30            | 0.15             | -0.320               | -0.410                | -0.320               | 0.08  | 10           |
| 51911    | 2001 QD68     | 13.520 | 0.078      | 0.120 | 0.080      | 13.10            | 0.15             | 13.06             | 0.15              | 13.10            | 0.15             | -0.420               | -0.460                | -0.420               | 0.32  | 10           |
| 52762    | 1998 MT24     | 14.690 | 0.206      | 0.000 | 0.200      | 14.70            | 0.15             | 14.61             | 0.15              | 14.60            | 0.15             | 0.010                | -0.080                | -0.090               | 0.40  | 10           |
| 53435    | 1999 VM40     | 14.910 | 0.078      | 0.200 | 0.040      | 14.60            | 0.15             | 14.48             | 0.15              | 14.52            | 0.15             | -0.310               | -0.430                | -0.390               | 0.25  | 10           |
| 58207    | 1992 EF14     | 16.500 | 0.112      | 0.120 | 0.080      | 15.80            | 0.15             | 15.76             | 0.15              | 15.80            | 0.15             | -0.700               | -0.740                | -0.700               | 0.28  | 10           |
| 61263    | 2000 OR28     | 15.460 | 0.112      | 0.240 | 0.110      | 14.80            | 0.15             | 14.83             | 0.15              | 14.80            | 0.15             | -0.660               | -0.630                | -0.660               | 0.30  | 10           |

Table 2: *cont.*

| Asteroid          | $H$    | $\delta H$ | $G$   | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|-------------------|--------|------------|-------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 62112 2000 RM99   | 13.880 | 0.094      | 0.120 | 0.080      | 13.70            | 0.15             | 13.46            | 0.15             | 13.70            | 0.15             | -0.180               | -0.420               | -0.180               | 0.73  | 10           |
| 63634 2001 QU86   | 15.170 | 0.094      | 0.240 | 0.110      | 15.30            | 0.15             | 14.58            | 0.15             | 15.30            | 0.15             | 0.130                | -0.590               | 0.130                | 0.63  | 10           |
| 64588 2001 XX3    | 14.230 | 0.139      | 0.240 | 0.110      | 13.70            | 0.15             | 13.65            | 0.15             | 13.70            | 0.15             | -0.530               | -0.580               | -0.530               | 0.83  | 10           |
| 65803 Didymos     | 18.160 | 0.030      | 0.200 | 0.020      | 18.00            | 0.15             | 17.95            | 0.15             | 17.95            | 0.15             | -0.160               | -0.210               | -0.210               | 0.08  | 8            |
| 66063 1998 RO1    | 18.050 | 0.071      | 0.120 | 0.050      | 18.10            | 0.15             | 17.95            | 0.15             | 17.95            | 0.15             | 0.050                | -0.100               | -0.100               | 0.13  | 8            |
| 66335 1999 JZ61   | 13.900 | 0.086      | 0.240 | 0.110      | 13.50            | 0.15             | 13.37            | 0.15             | 13.50            | 0.15             | -0.400               | -0.530               | -0.400               | 0.47  | 10           |
| 67751 2000 UF48   | 14.805 | 0.122      | 0.180 | 0.100      | 14.40            | 0.15             | 14.46            | 0.15             | 14.40            | 0.15             | -0.405               | -0.345               | -0.405               | 0.36  | 10           |
| 68905 2002 JZ104  | 15.860 | 0.139      | 0.240 | 0.110      | 15.50            | 0.15             | 15.31            | 0.15             | 15.50            | 0.15             | -0.360               | -0.550               | -0.360               | 0.14  | 10           |
| 69230 Hermes      | 17.570 | 0.120      | 0.150 | 0.200      | 17.50            | 0.15             | 17.48            | 0.15             | 17.48            | 0.15             | -0.070               | -0.090               | -0.090               | 0.06  | 8            |
| 71200 1999 XT236  | 14.885 | 0.122      | 0.120 | 0.080      | 14.60            | 0.15             | 14.54            | 0.15             | 14.60            | 0.15             | -0.285               | -0.345               | -0.285               | 0.00  | 10           |
| 73371 2002 KA13   | 15.690 | 0.112      | 0.120 | 0.080      | 15.80            | 0.15             | 15.36            | 0.15             | 15.80            | 0.15             | 0.110                | -0.330               | 0.110                | 0.27  | 10           |
| 74355 1998 WJ12   | 14.760 | 0.112      | 0.240 | 0.110      | 14.40            | 0.15             | 14.25            | 0.15             | 14.40            | 0.15             | -0.360               | -0.510               | -0.360               | 0.15  | 10           |
| 76818 2000 RG79   | 14.260 | 0.090      | 0.450 | 0.100      | 13.50            | 0.15             | 13.44            | 0.15             | 13.43            | 0.15             | -0.760               | -0.820               | -0.830               | 0.14  | 10           |
| 85938 1999 DJ4    | 18.600 | 0.206      | 0.060 | 0.100      | 18.60            | 0.15             | 18.48            | 0.15             | 18.49            | 0.15             | 0.000                | -0.120               | -0.110               | 0.11  | 8            |
| 87426 2000 QH101  | 15.285 | 0.104      | 0.180 | 0.100      | 15.10            | 0.15             | 14.94            | 0.15             | 15.60            | 0.15             | -0.185               | -0.345               | 0.315                | 0.14  | 10           |
| 88188 2000 XH44   | 16.530 | 0.206      | 0.350 | 0.200      | 16.00            | 0.15             | 15.95            | 0.15             | 15.90            | 0.15             | -0.530               | -0.580               | -0.630               | 0.06  | 10           |
| 88710 2001 SL9    | 18.070 | 0.078      | 0.460 | 0.130      | 17.60            | 0.15             | 17.44            | 0.15             | 17.43            | 0.15             | -0.470               | -0.630               | -0.640               | 0.08  | 8            |
| 88850 2001 SL222  | 15.630 | 0.071      | 0.120 | 0.080      | 15.90            | 0.15             | 15.27            | 0.15             | 15.90            | 0.15             | 0.270                | -0.360               | 0.270                | 0.22  | 10           |
| 89136 2001 US16   | 20.290 | 0.112      | 0.300 | 0.100      | 20.20            | 0.15             | 20.17            | 0.15             | 20.18            | 0.15             | -0.090               | -0.120               | -0.110               | 0.90  | 10           |
| 89355 2001 VS78   | 15.740 | 0.206      | 0.100 | 0.100      | 15.60            | 0.15             | 15.47            | 0.15             | 15.45            | 0.15             | -0.140               | -0.270               | -0.290               | 0.50  | 10           |
| 91810 1999 TQ249  | 14.770 | 0.206      | 0.120 | 0.080      | 14.40            | 0.15             | 14.39            | 0.15             | 15.30            | 0.15             | -0.370               | -0.380               | 0.530                | 0.20  | 10           |
| 93195 2000 SV112  | 15.935 | 0.141      | 0.180 | 0.100      | 15.60            | 0.15             | 15.67            | 0.15             | 16.30            | 0.15             | -0.335               | -0.265               | 0.365                | 0.52  | 10           |
| 95868 2003 GB29   | 14.460 | 0.206      | 0.120 | 0.080      | 14.20            | 0.15             | 14.17            | 0.15             | 14.20            | 0.15             | -0.260               | -0.290               | -0.260               | 0.74  | 10           |
| 98015 2000 QS215  | 16.820 | 0.112      | 0.240 | 0.110      | 16.60            | 0.15             | 16.06            | 0.15             | 16.80            | 0.15             | -0.220               | -0.760               | -0.020               | 0.77  | 10           |
| 99475 2002 CR118  | 15.120 | 0.206      | 0.240 | 0.110      | 14.40            | 0.15             | 14.29            | 0.15             | 14.80            | 0.15             | -0.720               | -0.830               | -0.320               | 0.74  | 10           |
| 99907 1989 VA     | 18.000 | 0.200      | 0.230 | 0.000      | 17.90            | 0.15             | 17.81            | 0.15             | 17.78            | 0.15             | -0.100               | -0.190               | -0.220               | 0.15  | 12           |
| 100111 1993 FA51  | 15.040 | 0.112      | 0.120 | 0.080      | 14.80            | 0.15             | 14.77            | 0.15             | 14.80            | 0.15             | -0.240               | -0.270               | -0.240               | 0.00  | 10           |
| 101610 1999 CW7   | 16.510 | 0.110      | 0.240 | 0.110      | 16.10            | 0.15             | 15.98            | 0.15             | 16.10            | 0.15             | -0.410               | -0.530               | -0.410               | 0.38  | 10           |
| 103067 1999 XA143 | 16.990 | 0.149      | 0.240 | 0.110      | 16.60            | 0.15             | 16.56            | 0.15             | 16.51            | 0.15             | -0.390               | -0.430               | -0.480               | 0.49  | 10           |
| 105612 2000 RT99  | 14.450 | 0.071      | 0.240 | 0.110      | 14.10            | 0.15             | 13.98            | 0.15             | 14.40            | 0.15             | -0.350               | -0.470               | -0.050               | 0.00  | 10           |
| 113846 2002 TV239 | 16.930 | 0.112      | 0.240 | 0.110      | 16.40            | 0.15             | 16.28            | 0.15             | 16.10            | 0.15             | -0.530               | -0.650               | -0.830               | 0.20  | 10           |
| 114205 2002 VF105 | 15.910 | 0.206      | 0.240 | 0.110      | 15.20            | 0.15             | 15.20            | 0.15             | 15.20            | 0.15             | -0.710               | -0.710               | -0.710               | 0.90  | 10           |
| 114319 2002 XD58  | 15.940 | 0.121      | 0.240 | 0.110      | 15.60            | 0.15             | 15.44            | 0.15             | 15.60            | 0.15             | -0.340               | -0.500               | -0.340               | 0.14  | 10           |
| 119409 2001 TH72  | 15.860 | 0.112      | 0.240 | 0.110      | 15.60            | 0.15             | 15.59            | 0.15             | 16.10            | 0.15             | -0.260               | -0.270               | 0.240                | 1.28  | 10           |
| 125922 2001 XR234 | 15.630 | 0.206      | 0.120 | 0.080      | 15.50            | 0.15             | 15.62            | 0.15             | 15.80            | 0.15             | -0.130               | -0.010               | 0.170                | 0.71  | 10           |
| 126267 2002 AN86  | 16.100 | 0.121      | 0.240 | 0.110      | 15.50            | 0.15             | 15.58            | 0.15             | 15.60            | 0.15             | -0.600               | -0.520               | -0.500               | 0.00  | 10           |
| 131739 2001 YJ115 | 16.600 | 0.206      | 0.240 | 0.110      | 16.20            | 0.15             | 15.93            | 0.15             | 16.30            | 0.15             | -0.400               | -0.670               | -0.300               | 0.00  | 10           |
| 138971 2001 CB21  | 18.710 | 0.160      | 0.240 | 0.110      | 18.40            | 0.15             | 18.36            | 0.15             | 18.41            | 0.15             | -0.310               | -0.350               | -0.300               | 0.19  | 10           |
| 139345 2001 KA67  | 17.060 | 0.168      | 0.240 | 0.110      | 16.70            | 0.15             | 16.66            | 0.15             | 16.74            | 0.15             | -0.360               | -0.400               | -0.320               | 0.20  | 10           |
| 144411 2004 EW9   | 16.620 | 0.168      | 0.240 | 0.110      | 16.60            | 0.15             | 16.55            | 0.15             | 16.55            | 0.15             | -0.020               | -0.070               | -0.070               | 0.90  | 10           |
| 151803 2003 FE58  | 16.690 | 0.206      | 0.240 | 0.110      | 16.40            | 0.15             | 16.41            | 0.15             | 16.40            | 0.15             | -0.290               | -0.280               | -0.290               | 0.00  | 10           |
| 153002 2000 JG5   | 18.580 | 0.168      | 0.240 | 0.110      | 18.10            | 0.15             | 17.97            | 0.15             | 18.02            | 0.15             | -0.480               | -0.610               | -0.560               | 0.85  | 10           |
| 159669 2002 GY73  | 15.530 | 0.058      | 0.120 | 0.080      | 15.30            | 0.15             | 15.29            | 0.15             | 15.50            | 0.15             | -0.230               | -0.240               | -0.030               | 0.27  | 10           |
| 162210 1999 SM5   | 19.360 | 0.112      | 0.200 | 0.070      | 19.10            | 0.15             | 19.08            | 0.15             | 19.10            | 0.15             | -0.260               | -0.280               | -0.260               | 0.77  | 10           |

Table 2: *cont.*

| Asteroid |            | $H$    | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|----------|------------|--------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 162635   | 2000 SS164 | 16.980 | 0.177      | 0.240  | 0.110      | 16.40            | 0.15             | 16.40            | 0.15             | 16.36            | 0.15             | -0.580               | -0.580               | -0.620               | 0.86  | 10           |
| 163373   | 2002 PZ39  | 19.100 | 0.112      | 0.240  | 0.110      | 18.90            | 0.15             | 18.79            | 0.15             | 18.79            | 0.15             | -0.200               | -0.310               | -0.310               | 0.10  | 10           |
| 167208   | Lelekovice | 16.985 | 0.141      | 0.120  | 0.080      | 16.20            | 0.15             | 16.69            | 0.15             | 16.20            | 0.15             | -0.785               | -0.295               | -0.785               | 0.25  | 10           |
| 168318   | 1989 DA    | 19.080 | 0.100      | 0.230  | 0.000      | 18.90            | 0.15             | 18.84            | 0.15             | 18.83            | 0.15             | -0.180               | -0.240               | -0.250               | 0.12  | 12           |
| 175706   | 1996 FG3   | 17.760 | 0.030      | -0.070 | 0.020      | 18.20            | 0.15             | 18.38            | 0.15             | 18.00            | 0.15             | 0.440                | 0.620                | 0.240                | 0.08  | 7            |
| 176505   | 2001 YF29  | 16.210 | 0.112      | 0.240  | 0.110      | 16.00            | 0.15             | 15.89            | 0.15             | 16.00            | 0.15             | -0.210               | -0.320               | -0.210               | 0.56  | 10           |
| 183532   | 2003 GC27  | 15.440 | 0.112      | 0.120  | 0.080      | 15.00            | 0.15             | 15.07            | 0.15             | 15.00            | 0.15             | -0.440               | -0.370               | -0.440               | 0.84  | 10           |
| 185851   | 2000 DP107 | 18.020 | 0.200      | 0.000  | 0.100      | 18.20            | 0.15             | 18.15            | 0.15             | 18.15            | 0.15             | 0.180                | 0.130                | 0.130                | 0.18  | 8            |
| 188228   | 2002 TH267 | 16.690 | 0.206      | 0.150  | 0.200      | 16.30            | 0.15             | 16.39            | 0.15             | 16.30            | 0.15             | -0.390               | -0.300               | -0.390               | 0.20  | 10           |
| 190978   | 2001 XD101 | 15.990 | 0.112      | 0.240  | 0.110      | 15.50            | 0.15             | 15.46            | 0.15             | 15.20            | 0.15             | -0.490               | -0.530               | -0.790               | 0.58  | 10           |
| 196698   | 2003 SV77  | 15.930 | 0.112      | 0.120  | 0.080      | 15.70            | 0.15             | 15.61            | 0.15             | 15.70            | 0.15             | -0.230               | -0.320               | -0.230               | 0.27  | 10           |
| 205744   | 2002 BK25  | 18.330 | 0.112      | 0.240  | 0.110      | 18.10            | 0.15             | 18.01            | 0.15             | 18.07            | 0.15             | -0.230               | -0.320               | -0.260               | 0.00  | 10           |
| 206079   | 2002 RU66  | 15.120 | 0.112      | 0.120  | 0.080      | 14.90            | 0.15             | 14.81            | 0.15             | 14.90            | 0.15             | -0.220               | -0.310               | -0.220               | 0.00  | 10           |
| 206400   | 2003 SW52  | 17.020 | 0.112      | 0.240  | 0.110      | 16.50            | 0.15             | 16.42            | 0.15             | 16.50            | 0.15             | -0.520               | -0.600               | -0.520               | 0.37  | 10           |
| 210999   | 2001 XR49  | 15.390 | 0.058      | 0.120  | 0.080      | 15.40            | 0.15             | 15.19            | 0.15             | 15.40            | 0.15             | 0.010                | -0.200               | 0.010                | 0.00  | 10           |
| 211349   | 2002 TB120 | 15.970 | 0.112      | 0.240  | 0.110      | 15.40            | 0.15             | 15.29            | 0.15             | 15.40            | 0.15             | -0.570               | -0.680               | -0.570               | 0.73  | 10           |
| 213665   | 2002 SS50  | 16.220 | 0.086      | 0.120  | 0.080      | 16.20            | 0.15             | 15.68            | 0.15             | 16.20            | 0.15             | -0.020               | -0.540               | -0.020               | 0.18  | 10           |
| 217628   | Lugh       | 16.830 | 0.110      | 0.230  | 0.000      | 16.30            | 0.15             | 16.24            | 0.15             | 16.20            | 0.15             | -0.530               | -0.590               | -0.630               | 0.08  | 12           |
| 219525   | 2001 QG97  | 16.410 | 0.112      | 0.240  | 0.110      | 15.90            | 0.15             | 15.94            | 0.15             | 15.60            | 0.15             | -0.510               | -0.470               | -0.810               | 0.18  | 10           |
| 232067   | 2001 UR220 | 15.340 | 0.078      | 0.120  | 0.080      | 15.60            | 0.15             | 15.06            | 0.15             | 15.60            | 0.15             | 0.260                | -0.280               | 0.260                | 0.29  | 10           |
| 237442   | 1999 TA10  | 18.470 | 0.094      | 0.240  | 0.110      | 18.00            | 0.15             | 18.04            | 0.15             | 17.90            | 0.15             | -0.470               | -0.430               | -0.570               | 0.10  | 10           |
| 250365   | 2003 SJ307 | 16.710 | 0.112      | 0.240  | 0.110      | 15.90            | 0.15             | 15.72            | 0.15             | 15.90            | 0.15             | -0.810               | -0.990               | -0.810               | 0.47  | 10           |
| 250719   | 2005 SN21  | 15.530 | 0.206      | 0.120  | 0.080      | 15.50            | 0.15             | 15.20            | 0.15             | 15.50            | 0.15             | -0.030               | -0.330               | -0.030               | 0.82  | 10           |
| 252591   | 2001 XO1   | 16.090 | 0.064      | 0.120  | 0.080      | 15.90            | 0.15             | 15.77            | 0.15             | 15.90            | 0.15             | -0.190               | -0.320               | -0.190               | 0.30  | 10           |
| 254070   | 2004 HK42  | 16.115 | 0.104      | 0.180  | 0.100      | 15.60            | 0.15             | 15.59            | 0.15             | 15.60            | 0.15             | -0.515               | -0.525               | -0.515               | 0.22  | 10           |
| 257838   | 2000 JQ66  | 18.250 | 0.094      | 0.430  | 0.080      | 17.70            | 0.15             | 17.70            | 0.15             | 17.58            | 0.15             | -0.550               | -0.550               | -0.670               | 0.60  | 10           |
| 267494   | 2002 JB9   | 16.320 | 0.158      | 0.240  | 0.110      | 16.00            | 0.15             | 15.82            | 0.15             | 15.68            | 0.15             | -0.320               | -0.500               | -0.640               | 0.21  | 10           |
| 267729   | 2003 FC5   | 18.610 | 0.177      | 0.240  | 0.110      | 18.20            | 0.15             | 18.25            | 0.15             | 18.25            | 0.15             | -0.410               | -0.360               | -0.360               | 0.50  | 10           |
| 282631   | 2005 SV1   | 15.630 | 0.112      | 0.120  | 0.080      | 15.60            | 0.15             | 15.35            | 0.15             | 15.60            | 0.15             | -0.030               | -0.280               | -0.030               | 0.31  | 10           |
| 293743   | 2007 RL45  | 17.090 | 0.206      | 0.240  | 0.110      | 16.80            | 0.15             | 16.61            | 0.15             | 16.80            | 0.15             | -0.290               | -0.480               | -0.290               | 0.00  | 10           |
| 301844   | 1990 UA    | 19.710 | 0.080      | 0.230  | 0.000      | 19.70            | 0.15             | 19.62            | 0.15             | 19.61            | 0.15             | -0.010               | -0.090               | -0.100               | 0.10  | 12           |
|          | 1989 VB    | 19.940 | 0.120      | 0.230  | 0.000      | 19.90            | 0.15             | 19.90            | 0.15             | 19.92            | 0.15             | -0.040               | -0.040               | -0.020               | 0.32  | 12           |
|          | 1990 UP    | 20.450 | 0.100      | 0.230  | 0.000      | 21.30            | 0.15             | 21.27            | 0.15             | 21.16            | 0.15             | 0.850                | 0.820                | 0.710                | 0.80  | 12           |
|          | 1994 AW1   | 17.400 | 0.200      | 0.150  | 0.200      | 17.50            | 0.15             | 17.42            | 0.15             | 17.33            | 0.15             | 0.100                | 0.020                | -0.070               | 0.12  | 8            |
|          | 1994 CB    | 21.400 | 0.200      | 0.150  | 0.200      | 21.00            | 0.15             | 21.02            | 0.15             | 21.02            | 0.15             | -0.400               | -0.380               | -0.380               | 0.90  | 5            |
|          | 1998 QR15  | 18.450 | 0.158      | 0.240  | 0.110      | 18.10            | 0.15             | 18.02            | 0.15             | 17.93            | 0.15             | -0.350               | -0.430               | -0.520               | 0.11  | 10           |
|          | 1998 QR52  | 19.070 | 0.103      | 0.240  | 0.110      | 18.70            | 0.15             | 18.70            | 0.15             | 18.68            | 0.15             | -0.370               | -0.370               | -0.390               | 0.88  | 10           |
|          | 1999 JO8   | 17.100 | 0.168      | 0.240  | 0.110      | 16.90            | 0.15             | 16.94            | 0.09             | 16.97            | 0.15             | -0.200               | -0.160               | -0.130               | 0.09  | 10           |
|          | 1999 PJ1   | 18.410 | 0.130      | 0.240  | 0.110      | 18.00            | 0.15             | 17.96            | 0.15             | 18.06            | 0.15             | -0.410               | -0.450               | -0.350               | 1.10  | 10           |
|          | 2000 QN130 | 18.230 | 0.206      | -0.150 | 0.200      | 18.10            | 0.15             | 17.92            | 0.15             | 17.83            | 0.15             | -0.130               | -0.310               | -0.400               | 0.30  | 10           |
|          | 2000 UG11  | 20.970 | 0.100      | 0.320  | 0.100      | 20.40            | 0.15             | 20.32            | 0.15             | 20.30            | 0.15             | -0.570               | -0.650               | -0.670               | 0.10  | 8            |
|          | 2000 WL107 | 24.440 | 0.200      | 0.150  | 0.200      | 24.80            | 0.15             | 24.64            | 0.15             | 24.33            | 0.15             | 0.360                | 0.200                | -0.110               | 1.10  | 10           |
|          | 2001 TX16  | 14.160 | 0.117      | 0.120  | 0.080      | 14.00            | 0.15             | 13.97            | 0.15             | 14.10            | 0.15             | -0.160               | -0.190               | -0.060               | 0.47  | 10           |
|          | 2002 FD6   | 22.510 | 0.149      | 0.240  | 0.110      | 22.30            | 0.15             | 22.25            | 0.15             | 22.26            | 0.15             | -0.210               | -0.260               | -0.250               | 0.20  | 10           |

Table 2: *cont.*

| Asteroid  | $H$    | $\delta H$ | $G$    | $\delta G$ | $H_{\text{MPC}}$ | $G_{\text{MPC}}$ | $H_{\text{AsD}}$ | $G_{\text{AsD}}$ | $H_{\text{JPL}}$ | $G_{\text{JPL}}$ | $H_{\text{MPC}} - H$ | $H_{\text{AsD}} - H$ | $H_{\text{JPL}} - H$ | Ampl. | Reference(s) |
|-----------|--------|------------|--------|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|-------|--------------|
| 2002 NY40 | 19.230 | 0.200      | 0.150  | 0.200      | 19.00            | 0.15             | 18.96            | 0.15             | 19.19            | 0.15             | -0.230               | -0.270               | -0.040               | 1.30  | 10           |
| 2002 TD60 | 19.900 | 0.094      | 0.550  | 0.100      | 19.30            | 0.15             | 19.22            | 0.15             | 19.21            | 0.15             | -0.600               | -0.680               | -0.690               | 1.60  | 10           |
| 2003 AJ73 | 18.930 | 0.103      | 0.240  | 0.110      | 18.60            | 0.15             | 18.48            | 0.15             | 18.48            | 0.15             | -0.330               | -0.450               | -0.450               | 0.96  | 10           |
| 2003 AK18 | 19.880 | 0.130      | 0.240  | 0.110      | 19.70            | 0.15             | 19.64            | 0.15             | 19.64            | 0.15             | -0.180               | -0.240               | -0.240               | 0.19  | 10           |
| 2003 FG   | 19.570 | 0.112      | 0.240  | 0.110      | 19.70            | 0.15             | 19.72            | 0.15             | 19.72            | 0.15             | 0.130                | 0.150                | 0.150                | 1.40  | 10           |
| 2003 SR84 | 25.440 | 0.149      | 0.240  | 0.110      | 26.00            | 0.15             | 25.86            | 0.15             | 25.85            | 0.15             | 0.560                | 0.420                | 0.410                | 0.83  | 10           |
| 2004 JR1  | 17.620 | 0.158      | 0.120  | 0.080      | 17.60            | 0.15             | 17.55            | 0.15             | 17.55            | 0.15             | -0.020               | -0.070               | -0.070               | 0.13  | 10           |
| 2004 XO14 | 16.330 | 0.054      | 0.160  | 0.020      | 16.10            | 0.15             | 16.10            | 0.15             | 16.10            | 0.15             | -0.230               | -0.230               | -0.230               | 0.21  | 10           |
| 2005 AB   | 17.390 | 0.058      | -0.010 | 0.010      | 17.50            | 0.15             | 17.49            | 0.15             | 17.48            | 0.15             | 0.110                | 0.100                | 0.090                | 0.07  | 10           |
| 2005 SQ73 | 18.160 | 0.094      | 0.240  | 0.110      | 17.40            | 0.15             | 17.40            | 0.15             | 17.40            | 0.15             | -0.760               | -0.760               | -0.760               | 0.30  | 10           |
| 2005 TQ27 | 15.690 | 0.206      | 0.120  | 0.080      | 15.40            | 0.15             | 15.36            | 0.15             | 15.40            | 0.15             | -0.290               | -0.330               | -0.290               | 0.49  | 10           |

The catalog absolute magnitudes and slope parameters were taken from the MPC's file mpcorb.dat dated 2011 Nov. 27 ( $H_{\text{MPC}}, G_{\text{MPC}}$ ), from the AstDyS files allnum.cat, uftobs.cat and singopp.cat dated 2011 Dec. 16 ( $H_{\text{AsD}}, G_{\text{AsD}}$ ), and from the JPL Horizons files elements.numr and elements.unnum dated 2011 Nov. 24 ( $H_{\text{JPL}}, G_{\text{JPL}}$ ). The references for the  $H$  and  $G$  estimates, their uncertainties  $\delta H$  and  $\delta G$  and the lightcurve amplitudes are following: (1) Harris and Young (1989), (2) Harris et al. (1989), (3) Harris et al. (1992), (4) Harris et al. (1999), (5) Pravec et al. (1996), (6) Pravec et al. (1998), (7) Pravec et al. (2000), (8) Pravec et al. (2006), (9) Pravec et al. (2012), (10) Pravec et al., <http://www.asu.cas.cz/~ppravec/newres.htm>, (11) Reddy et al. (2007), (12) Wisniewski et al. (1997). Entries from reference (12) had not tabulated uncertainties of the  $G$  values in the original source (their Table 2), but they are given in the text of the paper; we refer readers needing the  $\delta G$  values for those entries to the original paper.

### 3 Accuracy and biases of the orbit catalog $H$ values

We compared the  $H$  estimates for asteroids in our sample with their  $H$  values from the orbit catalogs MPCORB, Pisa AstDyS and JPL Horizons.<sup>4</sup> We list the differences  $(H_{\text{MPCORB}} - H)$ ,  $(H_{\text{AstDyS}} - H)$  and  $(H_{\text{JPL}} - H)$  in Table 2 and plot them vs  $H$  in Figs. 1 to 3.

Generally, the catalog  $H$  values are good in the range of small  $H$  (large asteroids). There are small or no systematic offsets: the mean difference between the catalog and our  $H$  estimate is +0.040, +0.047 and -0.001 mag for MPCORB, AstDyS and JPL Horizons, respectively, and the standard deviations are 0.104 to 0.134 mag in the smallest  $H$  ranges (see Table 3). Though these standard deviations are greater than most of the estimated uncertainties  $\delta H$  for the large asteroids, they are actually not much greater than a typical dispersion of  $H$  with observing aspect (see Section 2.6). So, the catalog  $H$  values for the largest asteroids are almost as good as they could be estimated without a pole and shape modeling.

Going to smaller sizes (higher  $H$  values), we see a systematic offset to negative  $(H_{\text{catalog}} - H)$  values (i.e., the catalog  $H$  data being systematically too bright on average) with similar behaviors, but differing in some details in the three catalogs. Analyzing the behavior of the mean offset of the catalog  $H$  values, we plotted the running mean curves with the box size of 51 data points in Figs. 1 to 3 and we approximated the dependence with fitting a constant offset to points with the smallest  $H$  and linear functions in specific ranges of  $H$ ; their parameters are given in Table 3. The “break points” separating the different fitted ranges were chosen somewhat arbitrarily at  $H$  values near points where the running mean curve changes slope substantially and where the adjacent fitted lines cross.

The common features of the  $H$  data in the three catalogs are following: The mean  $(H_{\text{catalog}} - H)$  reaches a minimum (i.e., maximum negative offset) at  $H \sim 14$ . The negative offset increases steeply in the range from  $H \sim 12.2$  to  $\sim 13.7$ , but then it decreases rather slowly from 14 to 20.

Some interesting differences between the  $H$  data in the catalogs are following: The standard deviation of the MPCORB  $H$  data increases fairly gradually with increasing  $H$ , from  $\sigma = 0.102$  mag in the smallest  $H$  range, through 0.162 and 0.200 mag in the ranges centered at  $H$  around 10 and 13, to 0.242 mag in the range  $H = 14$ –20. The AstDyS data show, however, a higher consistency over a wider range of  $H$ , with  $\sigma$  increasing only slightly from 0.134 mag for the brightest asteroids to 0.152 mag for data in the range around  $H = 13$ , and their data in the highest  $H$  range of 14–20 are also internally the most consistent ones of all the three catalogs, with the smallest  $\sigma$  of 0.218 mag. The JPL Horizons data show the most diverse behavior. They are internally pretty

<sup>4</sup> In the AstOrb catalog, they adopt the MPCORB  $H$  values for numbered asteroids; we study the data from the three catalogs with independently calculated  $H$  values.



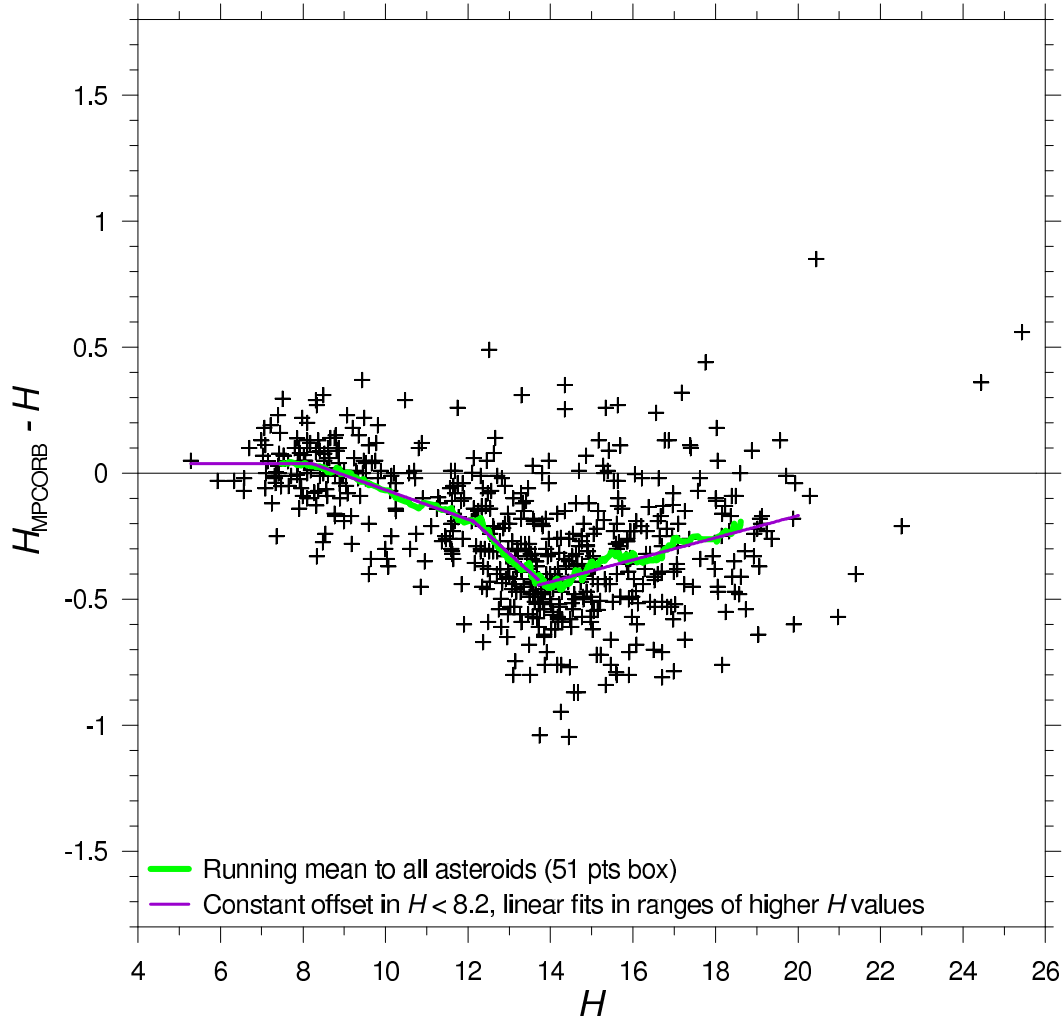


Fig. 1. Differences between the MPCORB catalog values and our absolute magnitude estimates are plotted. Parameters of the lines fitted to the data are given in Table 3.

consistent with  $\sigma = 0.116$  mag and zero mean offset up to  $H \sim 11$  where there begin to occur big outliers and their data become quite noisy above  $H = 12$ , with the standard deviation  $\sigma \sim 0.33$  mag between  $H = 12.3$  and 20.

The observed trends of the systematic offsets of the catalog  $H$  values are quite curious. We will discuss their possible causes in Section 5. First, in following subsections we analyse certain correlations of the mean offset with taxonomic types and lightcurve amplitudes.

### 3.1 Correlation of the mean offset with taxonomic classes

In Figs. 4 to 6, there are highlighted data for asteroids with known taxonomic types that uniquely classify the asteroids as medium- or low-albedo ones. The former group are asteroids that have been classified as S, A or L types, while

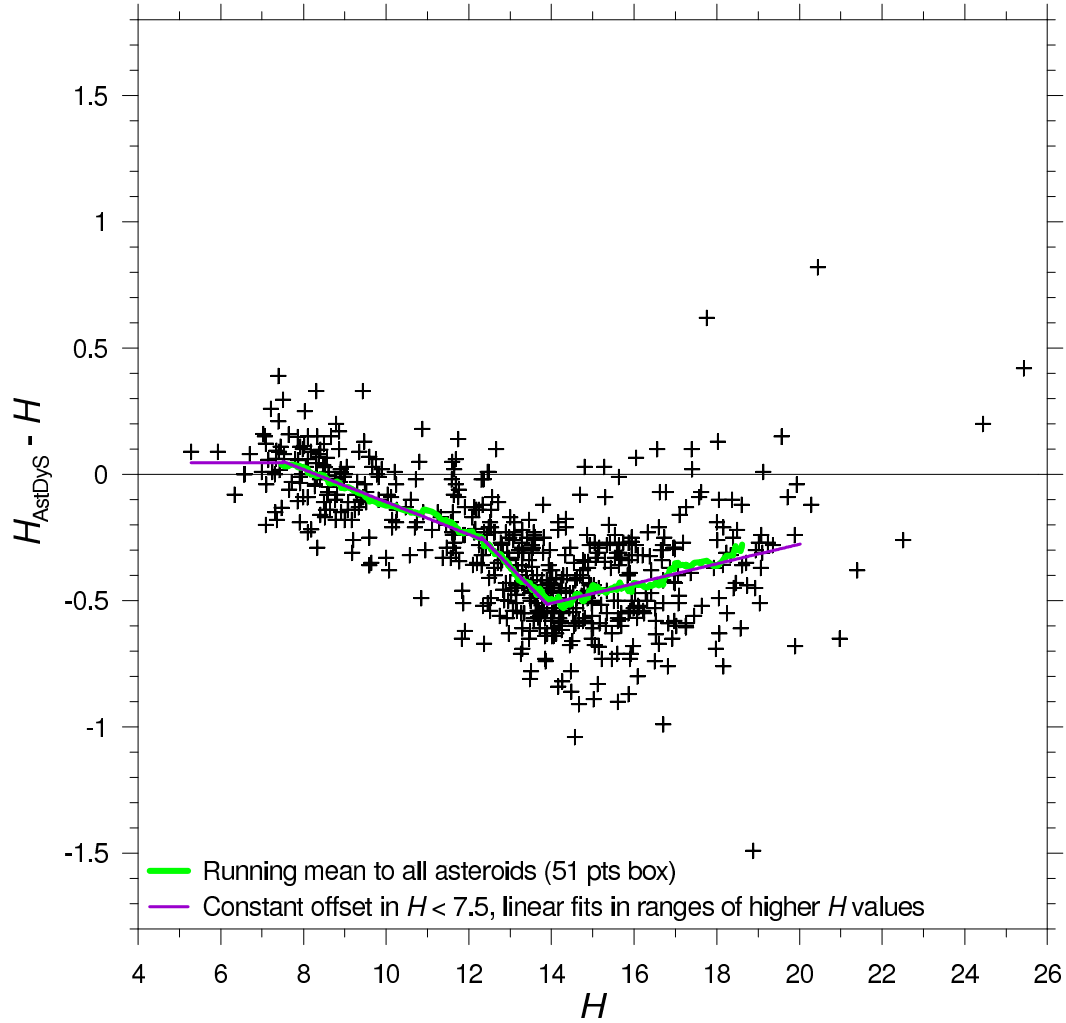


Fig. 2. Differences between the Pisa AstDyS catalog values and our absolute magnitude estimates are plotted. Parameters of the lines fitted to the data are given in Table 3.

the latter are those classified as C, G, B, F, P or D types. The taxonomy data were taken from Tholen (1989), Bus and Binzel (2002), DeMeo et al. (2009), Xu et al. (1995), and Lazzaro et al. (2004) as compiled in Neese (2010).

Among asteroids with  $H$  greater than  $\sim 10$  in our sample, most of those with known taxonomic types are medium-albedo ones. This is not surprising, as among the intrinsically fainter asteroids, there are fewer with established low-albedo taxonomic classes as those concentrate in outer parts of the main belt and thus they are mostly seen at fainter apparent magnitudes and so they are more difficult to be observed spectro-photometrically. Another reason was that our photometric observational projects sampling the range  $H > 12$  concentrated on inner-main belt and near-Earth asteroids where S and similar types visually predominate (having a higher number density in the  $H$  parameter space), so these types predominate in our sample at higher  $H$  values too, though we have got some low-albedo ones among the targeted and especially the accidentally imaged asteroids as well (see Section 4). As

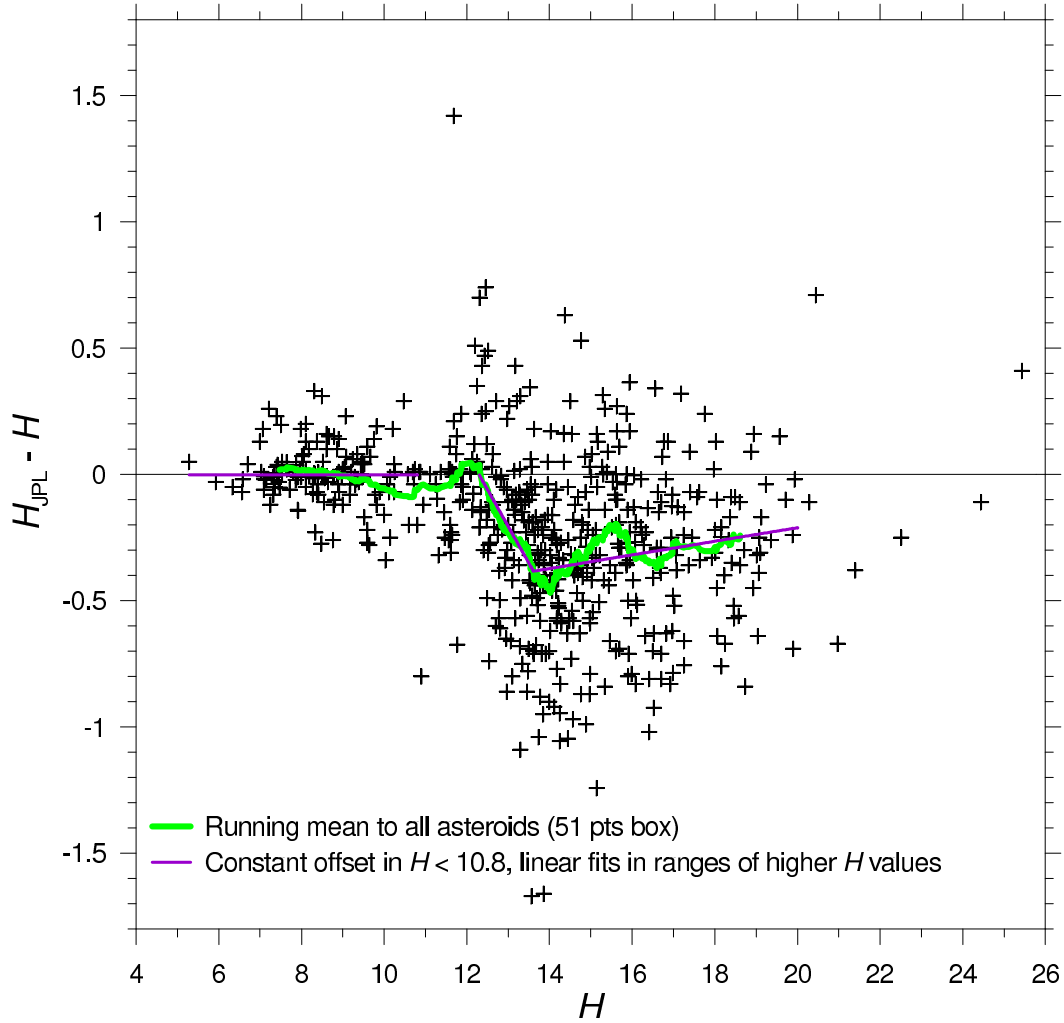


Fig. 3. Differences between the JPL Horizons catalog values and our absolute magnitude estimates are plotted. Parameters of the lines fitted to the data are given in Table 3. We did not fit a line in the range  $H = 10.8\text{--}12.3$  due to the small number of points affected by a few big outliers there.

the statistics of asteroids with known low-albedo types in the  $H > 10$  range is poor, we limit ourselves to analysing correlations of the mean offset with taxonomic classes to the range  $H < 10$  only.

Among large asteroids with  $H \lesssim 10$ , there appears to be a significant systematic difference between the mean offsets of the medium- and the low-albedo ones in the orbit catalogs  $H$  values. The difference is of nearly the same magnitude of 0.09 mag in the MPCORB and the Pisa AstDyS catalogs, but it is smaller, 0.043 mag in the JPL Horizons catalog. Specifically, for points with  $H < 9.5$ , the mean of  $(H_{\text{MPCORB}} - H)$  values for the low- and the medium-albedo type asteroids are +0.064 and  $-0.024$  mag, respectively. The mean of  $(H_{\text{AstDyS}} - H)$  values for the low- and the medium-albedo type asteroids are +0.044 and  $-0.048$  mag, respectively. The mean of  $(H_{\text{JPL}} - H)$  values for the low- and the medium-albedo type asteroids are +0.024 and  $-0.019$  mag, respectively.

Table 3

Parameters of the linear fits in Figs. 1 to 3,  $(H_{\text{catalog}} - H) = aH + b$ .

| Catalog      | $H$ range     | N   | $a$     | $b$    | $\sigma$ |
|--------------|---------------|-----|---------|--------|----------|
| MPCORB       | $< 8.2$       | 53  | 0       | 0.040  | 0.102    |
|              | $8.2 - 12.1$  | 125 | -0.0585 | 0.520  | 0.162    |
|              | $12.1 - 13.7$ | 124 | -0.1478 | 1.603  | 0.200    |
|              | $13.7 - 20.0$ | 274 | 0.0438  | -1.044 | 0.242    |
| AstDyS       | $< 7.5$       | 26  | 0       | 0.047  | 0.134    |
|              | $7.5 - 12.3$  | 160 | -0.0643 | 0.535  | 0.144    |
|              | $12.3 - 13.9$ | 138 | -0.1660 | 1.793  | 0.152    |
|              | $13.9 - 20.0$ | 256 | 0.0390  | -1.056 | 0.218    |
| JPL Horizons | $< 10.8$      | 139 | 0       | -0.001 | 0.116    |
|              | $12.3 - 13.6$ | 107 | -0.2909 | 3.576  | 0.348    |
|              | $13.6 - 20.0$ | 285 | 0.0270  | -0.750 | 0.322    |

$N$  is the number of fitted points in the given range of  $H$ ,  $\sigma$  is the standard deviation of the points from the fitted line.

We suspect that a reason for the observed “albedo dispersion”, with large low-albedo (mostly C type) asteroids having the systematically positive  $H$  offset while large medium-albedo (mostly S type) ones having the systematically negative  $H$  offset in the catalogs, is due to that the orbit computers assumed one default value for  $G$  of 0.15 for most asteroids in their computations of the absolute magnitudes from astrometric magnitude estimates. Another effect may be that of the assumed single value of  $(V - R) = 0.40$  they used for conversion of astrometric magnitude estimates that are made effectively in the R band mostly (as the maximum sensitivity of standard CCDs is in the red). As S types have actually higher mean  $G$  and  $(V - R)$ , while C types have lower mean  $G$  and  $(V - R)$  than the default values, the  $H$  values derived by the orbit computers for asteroids of the two different albedo type groups are offset in the opposite directions.

### 3.2 Correlation of the mean offset with lightcurve amplitude

There is apparent a small correlation of the  $(H_{\text{catalog}} - H)$  values with asteroid lightcurve amplitude. In Figs. 7 to 9, there are highlighted asteroids with amplitude  $\geq 0.4$  mag. The high-amplitude asteroids show a slightly greater negative mean  $H$  offset, estimated with the running mean plotted in the figures which is shifted down by a few 0.01 mag to  $\sim 0.1$  mag from the mean offset curve for all asteroids at most  $H$  values.

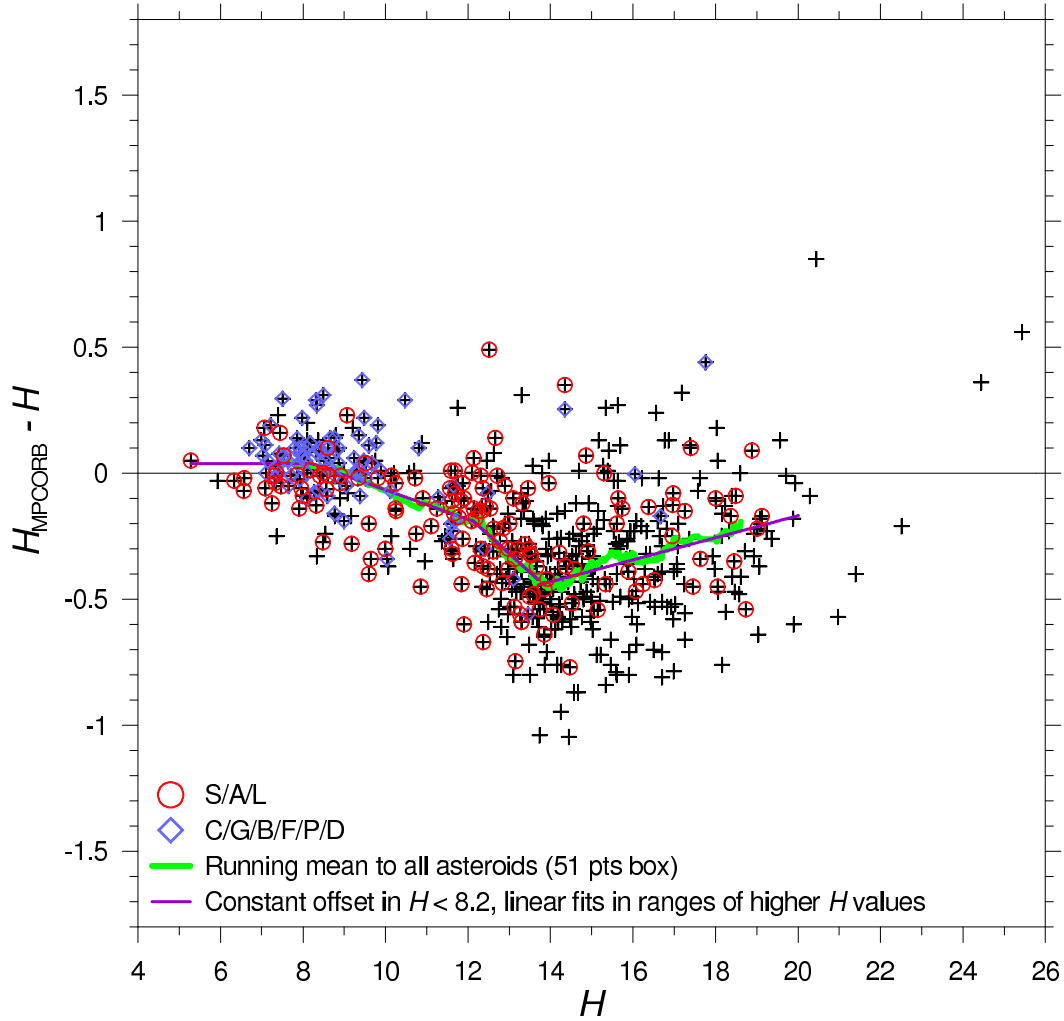


Fig. 4. Systematic offset between the MPCORB absolute magnitudes of medium (S, A, L) and low-albedo types (C, G, B, F, P, D) is apparent especially among bright asteroids with  $H < 10$ .

There may be a few reasons for high-amplitude asteroids showing the greater negative offset of the catalog  $H$  values. The astrometric observers could made their magnitude estimates more often from images taken when the asteroid was brighter than its mean light. It might be intentional for some follow-up observers, e.g., due to their aim to do more accurate astrometry on images with higher signal-to-noise ratio so they might choose measuring images taken closer to the lightcurve maximum rather than minimum. But it could also be a natural consequence of the flux-limited observations, both by the surveys and follow-up stations; a high-amplitude asteroid with mean brightness close to the signal-to-noise ratio limit of a given astrometric program is positively detected more frequently close to the lightcurve maximum than minimum. Another cause might be that high-amplitude asteroid observations are more likely to be taken at asteroid aspects close to equator-on where asteroids show lower mean cross-section than at aspects of higher astero-centric latitudes. So the mean absolute magnitude estimated at time when an asteroid shows a higher amplitude is typically fainter than the mean  $H$  estimated at an average aspect if the asteroid's pole obliquity is not close to 0 or 180°.

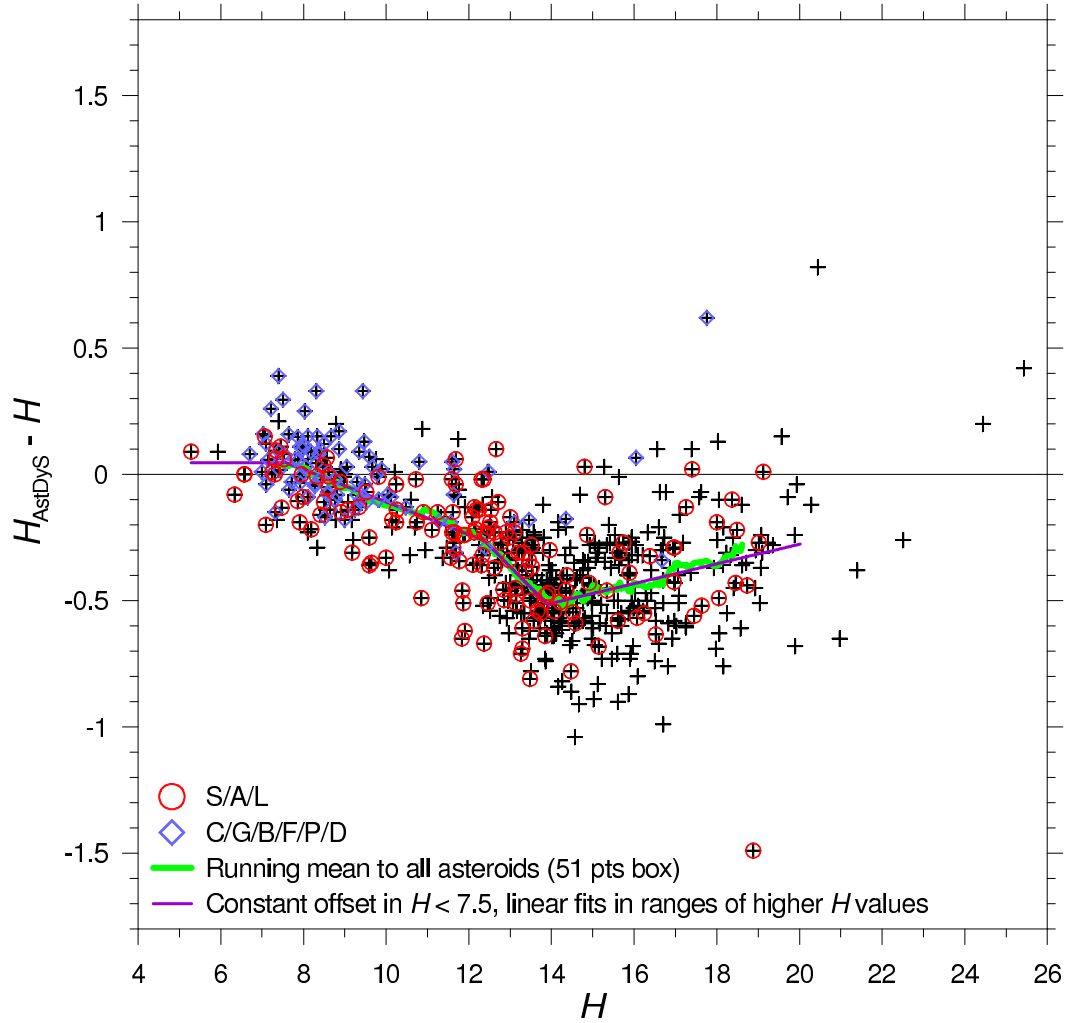


Fig. 5. As in Fig. 4, but for the AstDyS catalog absolute magnitudes.

### 3.3 Comparison with earlier works

The systematic offset of the  $H$  values in orbit catalogs was mentioned by several asteroid photometrists before. One particularly interesting work is Parker et al. (2008). They compared Johnson  $V$  data that they derived from the photometric measurements from the Sloan Digital Sky Survey (SDSS) Moving Object Catalog 4 for a sample of about 64,000 asteroids observed at solar phases between  $3^\circ$  and  $15^\circ$  to their apparent magnitudes ( $V_c$ ) predicted from the  $H$  and  $G$  values from the AstOrb catalog.<sup>5</sup> They found the mean  $(V_c - V) = -0.23$  mag. A correction of this offset to zero phase to obtain  $(H_c - H)$ , accounting for a difference between actual  $G$  values of the asteroids and the default  $G = 0.15$  assumed for most asteroids in AstOrb, is estimated to be about  $-0.02$  mag, assuming the mean solar phase of the SDSS observations of  $9^\circ$  and a mean  $G = 0.18$  for asteroids in the sample (corresponding

<sup>5</sup> See footnote 4 for comments on the correspondence between the  $H$  values in the AstOrb and MPCORB catalogs.

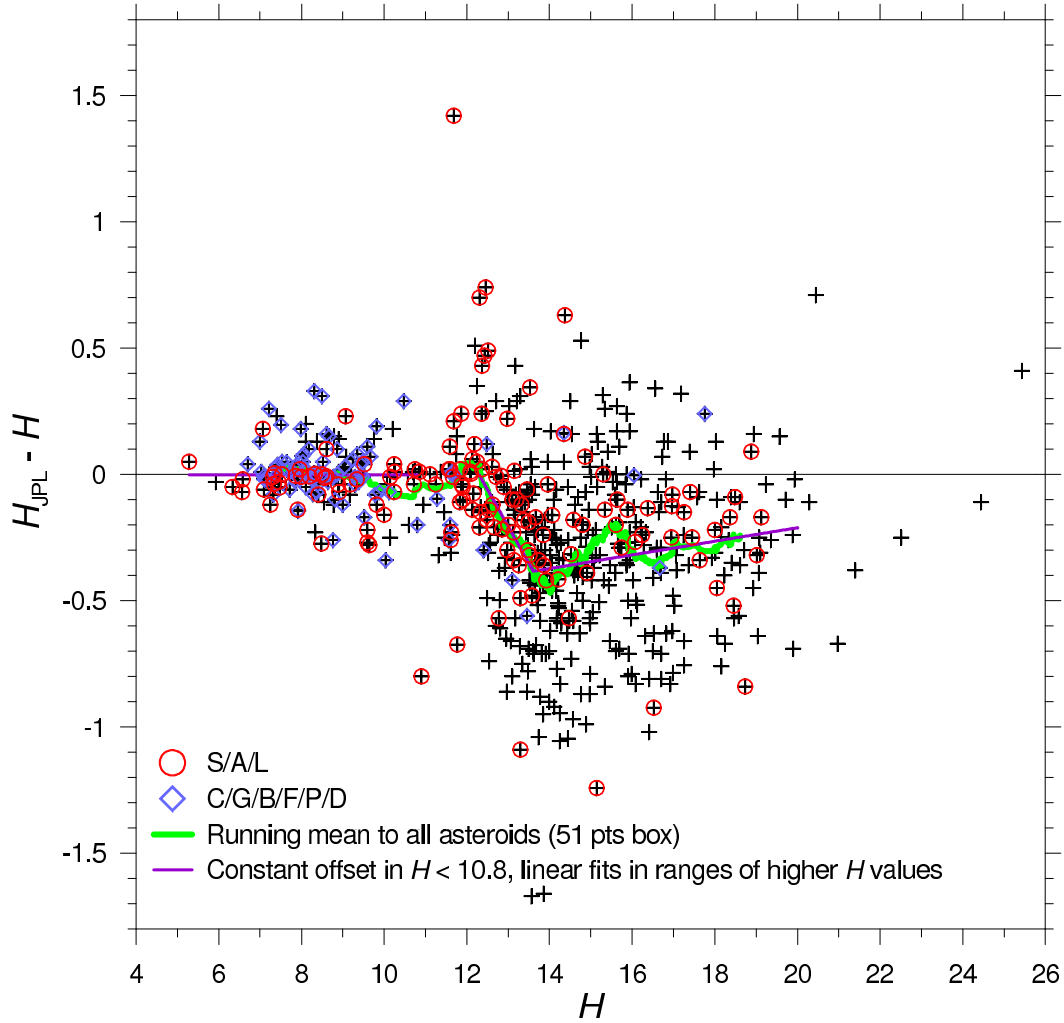


Fig. 6. As in Fig. 4, but for the JPL Horizons catalog absolute magnitudes.

to a 50:50 ratio between S/S-like and C/C-like asteroids in the sample). The resulting mean  $(H_{\text{AstOrb}} - H) \simeq -0.25$  mag is within the range of mean  $(H_{\text{MPCORB}} - H)$  that we found changing from  $-0.17$  to  $-0.43$  for  $H$  from  $20.0$  to  $14.0$  where most of the asteroids in the SDSS sample lie. To do an exact comparison, we will have to compute a weighted mean  $(H_{\text{MPCORB}} - H)$  for the particular distribution of the  $H$  values in the SDSS sample; this is a subject of future work.

Worth mentioning is also the earlier work using SDSS data by Jurić et al. (2002). They did an analysis similar to Parker et al. (2008), though on an earlier and smaller sample, but they compared the SDSS magnitudes to both the AstOrb and MPCORB magnitudes, and they also analysed a correlation of the offset with asteroid color. Specifically, they compared Johnson  $V$  data derived from the photometric measurements from the Sloan Digital Sky Survey (SDSS) Early Data Release for a sample of 1335 asteroids to their apparent magnitudes ( $V_c$ ) predicted from the  $H$  and  $G$  data from the AstOrb and MPCORB catalogs. They found the mean  $(V_{\text{AstOrb}} - V) = -0.41$ . They estimated the correction to zero phase to be  $-0.02 \pm 0.01$ , which gives the

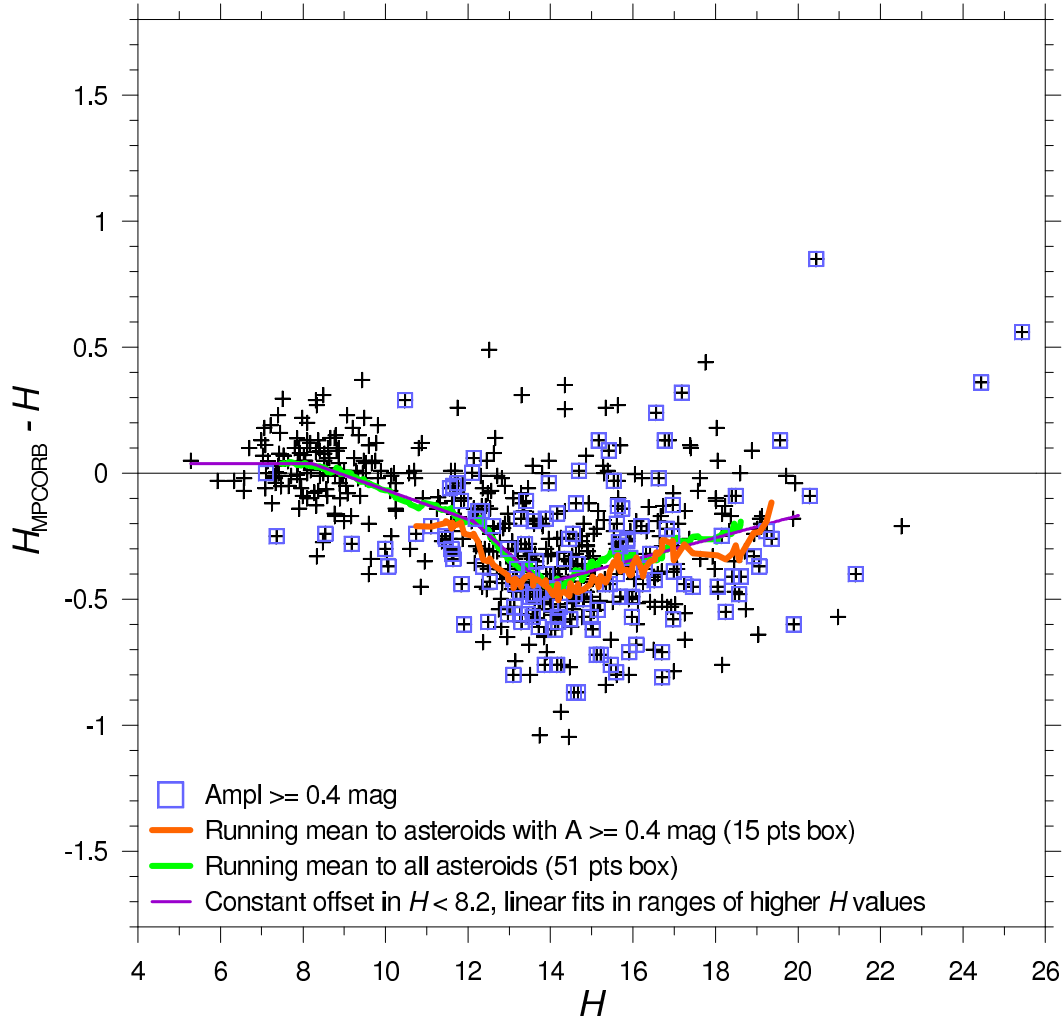


Fig. 7. A higher negative mean offset of the MPCORB absolute magnitudes for high-amplitude asteroids is shown.

mean  $(H_{\text{AstOrb}} - H) = -0.43$  for their sample. They also report the mean  $(V_{\text{MPCORB}} - V) \sim -0.2$ ; we speculate that the difference between the offsets of the two catalogs may reflect their different magnitude correction/weighting scheme the two orbit computer groups used at that time.<sup>6</sup> They also found a correlation of the apparent magnitude offset with the SDSS asteroid color, with the median offsets of the AstOrb magnitudes  $(V_c - V)$  of  $-0.34$  and  $-0.44$  for subsamples of blue and red asteroids, respectively.

The offset they found for the MPCORB magnitudes is somewhat lower than the offset we have got for asteroids with absolute magnitudes similar to the asteroids in their sample; for asteroids in our sample with  $H$  from 12 to 16, we got an average  $(H_{\text{MPCORB}} - H)$  of  $-0.36$ . A reason for the lower offset they

<sup>6</sup> Unlike in our work where our sample consists of numbered asteroids mostly and their AstOrb  $H$  values were taken from MPCORB (see footnote 4), the sample of Jurić et al. (2002) had a much greater fraction of (then-)unnumbered asteroids for which there were independent  $H$  estimates in the AstOrb catalog.



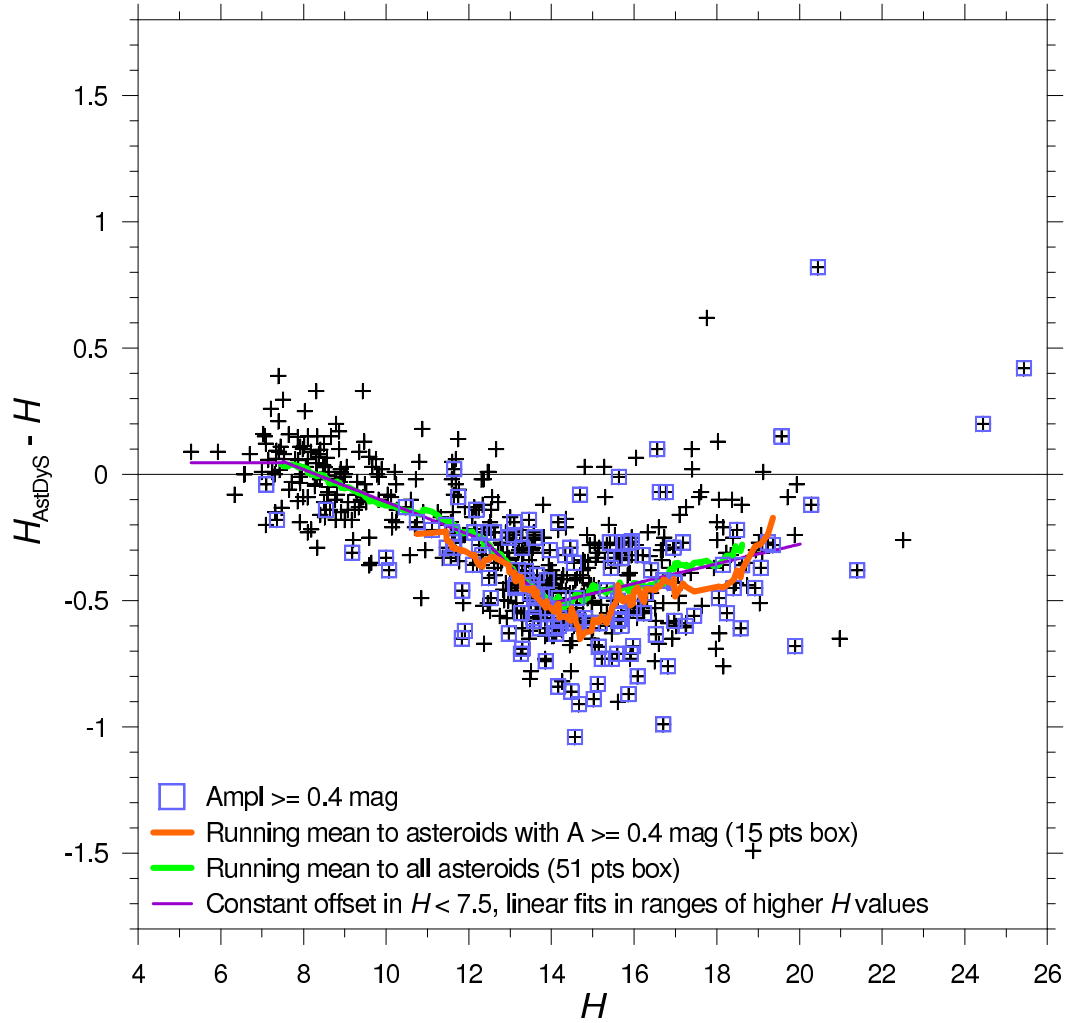


Fig. 8. As in Fig. 7, but for the AstDyS catalog absolute magnitudes.

found ten years ago is unclear. One possible cause is that the asteroid surveys predominating in the last ten years might produce more biased magnitude estimates than the (same or different) surveys did before 2002, or possibly the MPC's correction/weighting scheme for estimating  $H$  values from magnitude estimates worked better for the surveys operating before 2002 than during the last ten years. In any case, users of the  $H$  values from orbit catalogs should be aware that the offset of the catalog values can change with time due to development on the side of asteroid surveys (possible changes in photometric reduction procedures, or simply new surveys with their individual biases starting or increasing their relative contribution to the magnitude estimates data and older ones lessening or stopping their operation) or on the side of orbit computers (e.g., new correction and weighting schemes for magnitude estimates used in computing the  $H$  values).

The correlation of the offset with the SDSS asteroid color that they found is similar to the difference of 0.09 mag between the mean offsets for S/A/L (predominantly S) and C/G/B/F/P/D (predominantly C) types we found among large asteroids (see Section 3.1). There may be a common cause; both

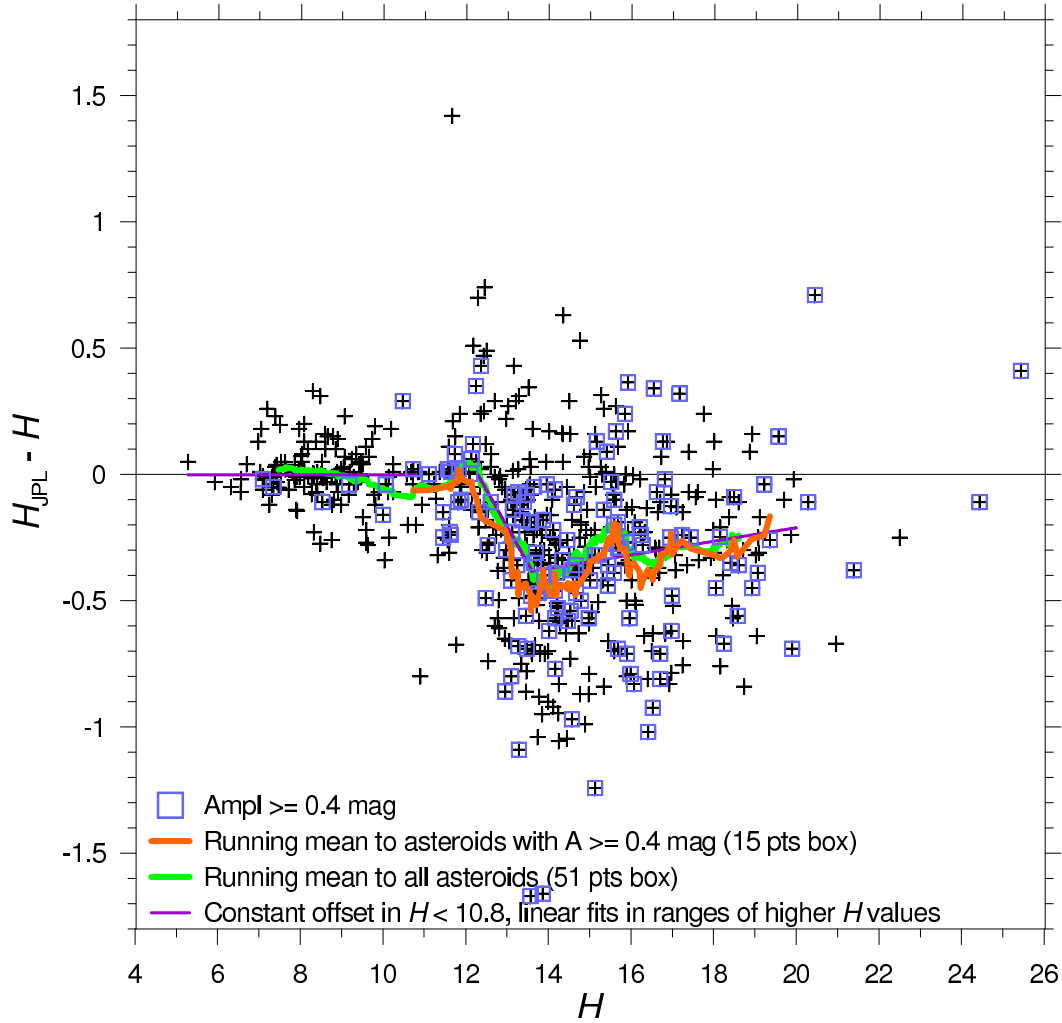


Fig. 9. As in Fig. 7, but for the JPL Horizons catalog absolute magnitudes.

we and Jurić et al. speculate that it may be due to the assumed single value of  $(V - R)$  used by the orbit computers for conversion of the astrometric magnitude estimates made effectively in or close to the red band to  $V$  for the asteroids of different colors.

Another interesting earlier work is Galád (2010). He analysed the SDSS data for 64 asteroids with rotation periods estimated in previous works, estimated their mean  $H$  values and compared them to MPCORB  $H$  values. For his sample covering a range of  $H = 9.2$  to  $17.7$  (the median  $H = 15.4$ ), he found an average of  $(H_{\text{MPCORB}} - H) = -0.28$ , its formal error (mean error of the mean) is  $\pm 0.03$ . A correction of the offset, which he estimated with assuming  $G = 0.15$  for most asteroids in his sample, for an actual estimated mean  $G = 0.19$  (for the ratio of 38:26 between S/S-like and C/C-like asteroids in his sample) is estimated to be  $-0.03$  mag. The resulted corrected mean  $(H_{\text{MPCORB}} - H) = -0.31 \pm 0.03$  is within  $2\sigma$  of a weighted mean of the  $(H_{\text{MPCORB}} - H)$  offset of  $-0.36$  we computed for his SDSS asteroids sample from our results given in the first part of this Section 3, so there is a reasonable agreement. Galád also mentioned a small correlation between the catalog absolute magnitudes

offset and lightcurve amplitude, which would be in agreement with our results in Sect. 3.2, but his finding was not statistically significant at a level greater than  $1\sigma$  for the small sample he analysed.

#### 4 Revised *WISE* albedos

We revised the estimates of asteroid albedos and diameters made by Masiero et al. (2011) and Mainzer et al. (2011b) within their NEOWISE project, using our  $H$  data and the recalculation method of Harris and Harris (1997). We outline our application of the method in following.

The relationship between the effective diameter, geometric albedo, and absolute magnitude is

$$D\sqrt{p_V}10^{H/5} = K, \quad (1)$$

where

$$K \equiv 2 \text{ AU} \cdot 10^{V_{sun}/5} = 1329 \pm 10 \text{ km}. \quad (2)$$

(See Pravec and Harris, 2007, for its derivation from the definition of those parameters plus the apparent magnitude of the Sun at 1 AU,  $V_{sun}$ , which includes the definition of the  $V$  magnitude scale.) The geometric and Bond albedos are related by

$$A_V \equiv qp_V, \quad (3)$$

where  $q$  is the phase integral. On the  $H$ – $G$  system,  $q$  is derived from  $G$  via

$$q = 0.290 + 0.684G. \quad (4)$$

A basic assumption of the method is that the quantity  $(1 - A_V)D^2$  is invariant. This can be used with Eqs. 1 to 4 to compute the revised value of albedo

$$p_{V\text{rev}} = \left[ q_{\text{rev}} + (1 - qp_V) \frac{D^2}{K^2} 10^{0.4H_{\text{rev}}} \right]^{-1}, \quad (5)$$

where  $H_{\text{rev}}$  is the new value of  $H$ ,  $q$  and  $q_{\text{rev}}$  are old and new values of the phase integral (Eq. 3), corresponding to old and new values of the slope parameter,  $G$  and  $G_{\text{rev}}$ . The revised diameter  $D_{\text{rev}}$  then follows from Eq. 1. We point out that the NEOWISE diameter estimates were generally stable and our revised diameters differ from their by an insignificant amount; a diameter estimate resulting from the thermal modeling is almost insensitive to uncertainty in  $H$  (see Harris and Harris, 1997).

A reason for this modification of the Harris&Harris method was that Masiero et al. (2011) and Mainzer et al. (2011b) allowed their  $H$  values to float in their modeling for some asteroids, but in their data files they gave only the original, starting  $H$  values and not their final, “best” fit ones. Thus their listed values of the resulted  $D, p_V$  and the starting  $H$  values do not obey Eq. 1 in those cases.<sup>7</sup> Therefore we used the present modification of Eq. 5 that uses the  $D$  value rather than the (non-available for the NEOWISE estimates)  $H$  value.

The original as well as the revised data are listed in Table 4. As the *WISE* data modelers assigned a random error of 0.2 or 0.3 mag to the MPCORB  $H$  values that they used in their albedo estimations (Masiero et al., 2011; Mainzer et al., 2011a,b)<sup>8</sup> and all our  $H$  estimates have uncertainties  $\leq 0.20$  mag, and considering that the Harris&Harris recalculation method should not contribute with a significant additional uncertainty, random errors of our revised albedos and diameters should be lower than or at worst equal to the uncertainties  $\delta D$  and  $\delta p_V$  calculated by Mainzer et al. and Masiero et al. that we list in Table 4. We did not attempt to revise these uncertainties as we did not have available an information on what was a contribution of their assumed 0.2- or 0.3-mag uncertainties for the MPCORB  $H$  values in their error calculation budgets for individual asteroids.

The revised albedo and diameter data are plotted in Fig. 10. In the figure, we highlighted points of known low-, medium- and high-albedo type asteroids. The mean  $p_V$  and the standard deviation (dispersion) of the sample are  $0.057 (\pm 0.013)$  and  $0.197 (\pm 0.051)$  for the Tholen/Bus/DeMeo C/G/B/F/P/D and the S/A/L types, respectively. The standard errors of the mean albedos are 0.002 and 0.006, respectively, but we consider that systematic observational or modeling errors may be greater than these formal errors.

Mainzer et al. (2011a) showed an apparent trend of S-type asteroids having higher albedos at smaller diameters, see their Figs. 1 and 2. They suspected that it was an artifact in the data rather than a real feature of the asteroid population, and they suggested that it could be due to “selection biases against small, low albedo objects”. We confirm their suspicion that the apparent albedo trend with size they saw was an artifact. Our data reveal that it was largely due to the systematic bias of MPCORB  $H$  values for smaller asteroids in the range  $H > 10$ . From our revised  $p_V$ – $D$  dataset, there is apparent only little difference between large and small S/A/L type asteroids; the mean  $p_V$  is  $0.178 \pm 0.008$  and  $0.209 \pm 0.008$  for S/A/L type asteroids larger and smaller than  $D = 25$  km, respectively. The difference between the mean

<sup>7</sup> An example of the case where the resulted  $D, p_V$  and the starting  $H$  values listed in the data files by Masiero et al. (2011) and Mainzer et al. (2011b) are mutually inconsistent is (70) Panopaea. Their listed  $D = 139.007$  km,  $p_V = 0.0397$  and  $H = 8.11$  give the product on the left side of Eq. 1 equal to 1160 km, which differs from the value of 1329 km from the definition by 13%.

<sup>8</sup> Mainzer et al. (2011a) took some  $H$  values for their detected and analysed asteroids also from the Light Curve Database (LCDB; Warner et al., 2009). We note that many of the  $H$  values in the LCDB were actually taken from MPCORB.

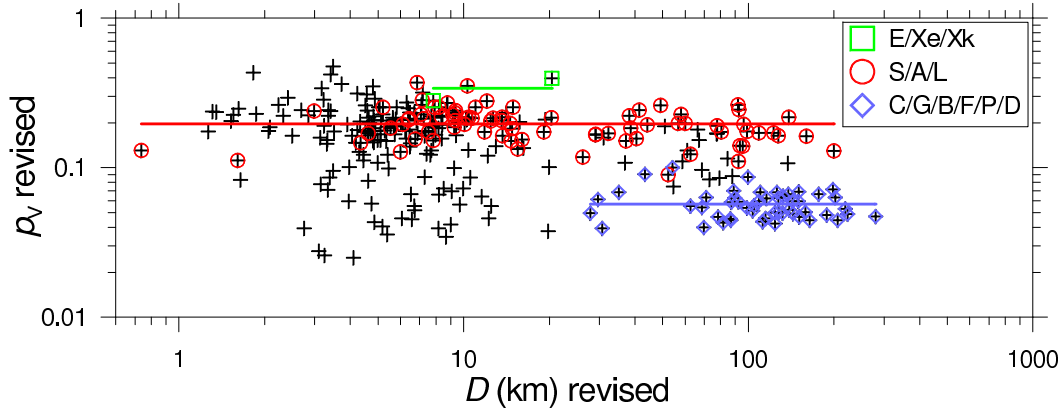


Fig. 10. The *WISE* albedos and diameters revised with the unbiased absolute magnitudes.

albedos of 0.031 is only marginally significant, as the formal standard error of the difference, propagated from the mean errors of the means of  $p_V$  values in the two size ranges, is 0.011. This minor difference might be a real feature with smaller S-type asteroids having slightly brighter surfaces possibly due to being less space weathered or having different scattering properties, but it could also be a small residual artifact, e.g., due to a small observational bias towards higher-albedo asteroids in the sample of small S types or a small systematic size dependence of their thermal properties not accounted for in the applied thermal models.

## 5 Possible causes for the offset in catalog $H$ values

Most of the procedures that astrometric surveys, follow-up observers, and orbit calculators used for estimating the apparent magnitudes of asteroids and derivation of the  $H$  values have not been comprehensively published so far. Thus we cannot really analyse reasons for the offset in the catalog  $H$  values. We present a few reasonable guesses and speculations in following.

The large offset seen for asteroids in the range of  $\pm$  a few magnitudes about  $H = 14$ , which are mostly main belt asteroids in our sample, may be related to the fact that a number of their astrometric observations could be done not very high above magnitude limits of the most productive surveys, especially when observed close to their aphelions or at higher solar elongations away from opposition. Results of photometric reduction of faint asteroid images are sensitive to things like a quality of flat field, an accuracy of estimation of the sky background level and a quality of background objects removal.

Another possible way how main belt asteroids with  $H > 12$  could get biased magnitude estimates is if the few surveys which took most of their observations had some flaws in their photometric reduction procedures or a way how

they reported the magnitude estimates to the MPC. For instance, if observations taken with a clear or no filter are reported without a filter code, the magnitude estimates are taken as B band observations—for the B band being the default for astrometric magnitude estimates, a standard inherited from the photographic plate time—and they are converted to  $V$  with subtracting  $(B - V) \sim 0.8$  (about the mean asteroidal color index), resulting in extremely incorrect magnitudes. Or if observations calibrated using local standards with magnitudes in the Johnson  $R$  system are erroneously reported as  $V$ , then they are off by about  $-0.4$  or  $-0.5$  mag, depending on the  $(V - R)$  color index of a given asteroid. We do not know whether the above two or some other errors occurred for reported asteroid magnitude estimates frequently enough so that they could cause the huge offset. Anyway, a thorough check of procedures of reducing and reporting magnitude estimates used by the major surveys would be good.

A reason for why the trend reverses above  $H = 14$ , with the mean offset in the MPCORB values being about half as large at  $H \sim 19$  than at  $\sim 14$  may be related to the fact that there is an increasing proportion of near-Earth asteroids (NEAs) with increasing  $H$  in the sample. The MBA/NEA turning point is about  $H = 16$ ; while most of the asteroids in our sample in the range  $H = 15$ – $16$  are main belt asteroids (there are 17 NEAs among the 62 asteroids in this  $H$  range), most of those in  $H = 16$ – $17$  are NEAs (29 of 44). The reason may be in that some or many NEAs got a substantial number of targeted follow-up observations, while small and faint main belt asteroids normally do not get any targeted follow-up and most or all their observations are by surveys only; targeted observations are potentially of a higher quality.

Of an interest is also that the AstDyS  $H$  values are intrinsically more consistent (see their smaller scatter around the mean curves and fitted lines in Section 3), but they are slightly more biased than the MPCORB values. It seems that the magnitude correction/weighting scheme used at AstDyS does a good work in converting magnitude estimates by different stations to become a more homogeneous set, but it does not eliminate their overall bias.

We conclude with stating that it appears to be very necessary and urgent to re-examine the photometric reduction routines and ways of reporting magnitude estimates used by asteroid astrometric observers. Improvements on the side of orbit computers, e.g., a use of more sophisticated magnitude correction and weighting schemes for estimating the  $H$  values, tying magnitude estimates reported by astrometric stations to accurate observations by photometric observers, could fix the situation at least partially as well. But improvements in measurement rather than subsequent data processing are always the preferred way. In particular, calibration using photometric star catalogs would be superior to using magnitudes given in most astrometric star catalogs. If the  $H$  values from orbit catalogs are to be used for purposes like asteroid albedo estimation or size-frequency distribution determination, they should be seriously more accurate than they are now.

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Table 4: *WISE* diameter and albedo data

| Asteroid |            | WISE |         |         |                |                 | H     | G      | Revised |                | Taxon. |     |     |     |     |     |     |
|----------|------------|------|---------|---------|----------------|-----------------|-------|--------|---------|----------------|--------|-----|-----|-----|-----|-----|-----|
|          |            | G    | D (km)  | δD (km) | p <sub>V</sub> | δp <sub>V</sub> |       |        | D (km)  | p <sub>V</sub> | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 8        | Flora      | 0.28 | 140.000 | 1.160   | 0.2614         | 0.0484          | 6.560 | 0.320  | 138.814 | 0.2179         | S      | S   |     | Sw  |     |     |     |
| 9        | Metis      | 0.17 | 199.591 | 0.000   | 0.1343         | 0.0000          | 6.330 | 0.230  | 199.959 | 0.1298         | S      | S   |     |     |     | T   | T   |
| 11       | Parthenope | 0.15 | 159.108 | 5.944   | 0.1585         | 0.0365          | 6.570 | 0.240  | 160.091 | 0.1623         | S      | S   | Sk  | Sq  |     |     |     |
| 12       | Victoria   | 0.22 | 126.643 | 3.199   | 0.1400         | 0.0137          | 7.060 | 0.220  | 127.343 | 0.1633         | SL     | S   | L   |     |     | D   | D   |
| 17       | Thetis     | 0.15 | 93.335  | 2.627   | 0.1597         | 0.0092          | 7.900 | 0.230  | 93.337  | 0.1403         | S      | S   | Sl  | S   |     |     |     |
| 19       | Fortuna    | 0.10 | 223.000 | 43.596  | 0.0499         | 0.0198          | 7.152 | 0.162  | 223.193 | 0.0489         | CG     | G   | Ch  | Ch  |     |     |     |
| 24       | Themis     | 0.19 | 202.336 | 6.054   | 0.0641         | 0.0157          | 7.088 | 0.180  | 202.248 | 0.0631         | CB     | C   | B   | C   |     | B   | C   |
| 30       | Urania     | 0.15 | 98.408  | 2.136   | 0.1711         | 0.0338          | 7.530 | 0.230  | 99.006  | 0.1753         | S      | S   | Sl  | S   |     |     |     |
| 31       | Euphrosyne | 0.15 | 280.000 | 60.776  | 0.0454         | 0.0445          | 6.700 | 0.090  | 279.821 | 0.0471         | C      | C   | Cb  |     |     |     |     |
| 38       | Leda       | 0.15 | 116.000 | 15.501  | 0.0617         | 0.0162          | 8.315 | 0.090  | 115.858 | 0.0621         | C      | C   | Cgh | Cgh |     |     |     |
| 45       | Eugenia    | 0.07 | 206.141 | 6.218   | 0.0458         | 0.0055          | 7.422 | 0.130  | 206.290 | 0.0446         | CF     | FC  | C   |     |     |     |     |
| 46       | Hestia     | 0.06 | 124.000 | 9.641   | 0.0520         | 0.0113          | 8.400 | 0.120  | 124.089 | 0.0501         | PX     | P   | Xc  |     |     |     |     |
| 47       | Aglaja     | 0.16 | 138.000 | 11.108  | 0.0672         | 0.0091          | 7.861 | 0.178  | 138.038 | 0.0665         | CB     | C   | B   |     |     | B   | B   |
| 53       | Kalypso    | 0.15 | 115.000 | 10.324  | 0.0400         | 0.0065          | 8.660 | 0.090  | 115.025 | 0.0459         | CX     | XC  |     |     | C   |     |     |
| 57       | Mnemosyne  | 0.15 | 122.466 | 4.699   | 0.1817         | 0.0468          | 7.090 | 0.220  | 122.731 | 0.1711         | S      | S   | S   | S   |     | S   | S   |
| 58       | Concordia  | 0.15 | 92.307  | 1.541   | 0.0592         | 0.0051          | 8.860 | 0.090  | 92.195  | 0.0594         | C      | C   | Ch  | Ch  |     | Caa | Cgh |
| 60       | Echo       | 0.27 | 60.000  | 3.519   | 0.1905         | 0.0245          | 8.484 | 0.250  | 60.028  | 0.1980         | S      | S   | S   |     |     |     |     |
| 70       | Panopaea   | 0.14 | 139.007 | 3.851   | 0.0397         | 0.0090          | 8.100 | 0.130  | 139.327 | 0.0524         | C      | C   | Ch  | Cgh |     |     |     |
| 71       | Niobe      | 0.40 | 92.842  | 0.644   | 0.2475         | 0.0346          | 7.310 | 0.400  | 92.753  | 0.2446         | SX     | S   | Xe  |     |     |     |     |
| 72       | Feronia    | 0.15 | 79.478  | 1.944   | 0.0742         | 0.0084          | 8.790 | 0.000  | 79.302  | 0.0856         | SDTG   | TDG |     |     | STD |     |     |
| 75       | Eurydike   | 0.23 | 68.593  | 1.970   | 0.0979         | 0.0139          | 8.970 | 0.230  | 68.578  | 0.0970         | MX     | M   | Xk  |     |     |     |     |
| 76       | Freia      | 0.15 | 158.567 | 8.020   | 0.0486         | 0.0072          | 7.864 | 0.070  | 158.400 | 0.0503         | CPX    | P   | X   | C   |     |     |     |
| 77       | Frigga     | 0.16 | 67.180  | 0.903   | 0.1530         | 0.0461          | 8.522 | 0.160  | 67.176  | 0.1527         | MX     | MU  | Xe  | Xe  |     |     |     |
| 99       | Dike       | 0.15 | 71.311  | 3.611   | 0.0587         | 0.0138          | 9.350 | 0.090  | 71.282  | 0.0633         | CX     | C   | Xk  | Xk  |     |     |     |
| 102      | Miriam     | 0.15 | 87.033  | 0.000   | 0.0458         | 0.0000          | 9.300 | 0.090  | 86.930  | 0.0445         | CP     | P   | C   |     |     |     |     |
| 107      | Camilla    | 0.08 | 219.374 | 5.938   | 0.0540         | 0.0113          | 7.100 | 0.090  | 219.378 | 0.0530         | CX     | C   | X   |     |     | X   | X   |
| 109      | Felicitas  | 0.04 | 89.000  | 6.165   | 0.0705         | 0.0093          | 8.759 | 0.030  | 88.971  | 0.0700         | CG     | GC  | Ch  |     |     | Caa | Ch  |
| 114      | Kassandra  | 0.15 | 100.000 | 0.000   | 0.0877         | 0.0000          | 8.275 | 0.090  | 99.798  | 0.0868         | XTK    | T   | Xk  | K   |     |     |     |
| 125      | Liberatrix | 0.33 | 61.122  | 1.084   | 0.1153         | 0.0270          | 8.900 | 0.220  | 61.058  | 0.1305         | MX     | M   | X   |     |     |     |     |
| 130      | Elektra    | 0.15 | 198.933 | 4.108   | 0.0714         | 0.0107          | 6.990 | 0.090  | 198.641 | 0.0716         | CG     | G   | Ch  | Ch  |     | Caa | Ch  |
| 133      | Cyrene     | 0.13 | 80.487  | 1.879   | 0.1759         | 0.0168          | 7.990 | 0.130  | 80.452  | 0.1738         | S      | SR  | S   | S   |     | S   | S   |
| 134      | Sophrosyne | 0.28 | 112.200 | 10.798  | 0.0440         | 0.0158          | 8.770 | 0.280  | 112.188 | 0.0436         | C      | C   | Ch  |     |     |     |     |
| 135      | Hertha     | 0.15 | 77.000  | 7.833   | 0.1520         | 0.0500          | 8.100 | 0.240  | 77.697  | 0.1684         | MX     | M   | Xk  |     |     |     |     |
| 137      | Meliboea   | 0.15 | 144.000 | 11.272  | 0.0514         | 0.0106          | 8.100 | 0.090  | 143.788 | 0.0492         | C      | C   |     |     |     |     |     |
| 139      | Juewa      | 0.15 | 164.000 | 25.212  | 0.0446         | 0.0232          | 7.924 | 0.150  | 163.995 | 0.0444         | CPX    | CP  | X   |     |     |     |     |
| 145      | Adeona     | 0.15 | 151.000 | 0.000   | 0.0434         | 0.0000          | 8.050 | 0.090  | 150.952 | 0.0467         | C      | C   | Ch  |     |     | Caa | Ch  |
| 146      | Lucina     | 0.11 | 131.812 | 4.794   | 0.0534         | 0.0100          | 8.277 | 0.186  | 131.893 | 0.0496         | C      | C   | Ch  |     |     |     |     |
| 154      | Bertha     | 0.15 | 188.755 | 4.758   | 0.0461         | 0.0027          | 7.530 | 0.090  | 188.647 | 0.0483         | C      |     | C   |     |     | C   | Cb  |
| 156      | Xanthippe  | 0.15 | 110.718 | 2.187   | 0.0504         | 0.0120          | 8.310 | -0.120 | 110.409 | 0.0687         | C      | C   | Ch  |     |     | Caa | Ch  |
| 159      | Aemilia    | 0.15 | 127.434 | 2.714   | 0.0614         | 0.0100          | 8.100 | 0.090  | 127.300 | 0.0627         | C      | C   | Ch  |     |     |     |     |
| 163      | Erigone    | 0.04 | 81.579  | 3.062   | 0.0330         | 0.0043          | 9.480 | -0.040 | 81.611  | 0.0428         | C      | C   | Ch  |     |     |     |     |
| 166      | Rhodope    | 0.15 | 54.551  | 1.535   | 0.0657         | 0.0145          | 9.750 | 0.090  | 54.564  | 0.0747         | CXG    | GC: | Xe  |     |     | X   | Xk  |
| 187      | Lamberta   | 0.15 | 133.014 | 2.497   | 0.0642         | 0.0101          | 7.980 | -0.040 | 132.457 | 0.0647         | C      | C   | Ch  |     |     |     |     |

Table 4: *cont.*

| Asteroid |             | WISE |         |         |                |                 | H      | G      | Revised |                | Taxon. |      |     |     |     |     |
|----------|-------------|------|---------|---------|----------------|-----------------|--------|--------|---------|----------------|--------|------|-----|-----|-----|-----|
|          |             | G    | D (km)  | δD (km) | p <sub>V</sub> | δp <sub>V</sub> |        |        | D (km)  | p <sub>V</sub> | (0)    | (1)  | (2) | (3) | (4) | (5) |
| 189      | Phthia      | 0.15 | 40.559  | 0.394   | 0.1991         | 0.0244          | 9.600  | 0.230  | 40.381  | 0.1566         | S      | S    | Sa  |     |     |     |
| 201      | Penelope    | 0.24 | 88.092  | 2.792   | 0.0967         | 0.0060          | 8.540  | 0.170  | 87.720  | 0.0881         | MX     | M    | X   | Xk  |     |     |
| 211      | Isolda      | 0.12 | 143.000 | 21.629  | 0.0603         | 0.0177          | 7.900  | 0.120  | 142.986 | 0.0598         | C      | C    | Ch  |     |     |     |
| 216      | Kleopatra   | 0.29 | 138.000 | 19.374  | 0.1111         | 0.0336          | 7.350  | 0.280  | 137.794 | 0.1068         | MX     | M    | Xe  | Xe  |     |     |
| 218      | Bianca      | 0.32 | 56.766  | 1.072   | 0.1972         | 0.0432          | 8.607  | 0.310  | 56.735  | 0.1979         | S      | S    |     |     |     |     |
| 219      | Thusnelda   | 0.15 | 38.078  | 0.935   | 0.2280         | 0.0202          | 9.340  | 0.230  | 38.279  | 0.2214         | SL     | S    |     |     | S   | L   |
| 226      | Weringia    | 0.15 | 37.003  | 0.389   | 0.1527         | 0.0107          | 9.820  | 0.230  | 37.154  | 0.1510         | S      |      | S   | S   | S   | Sk  |
| 230      | Athamantis  | 0.27 | 109.000 | 13.025  | 0.1710         | 0.0762          | 7.346  | 0.272  | 109.025 | 0.1713         | S      | S    | Sl  |     |     |     |
| 236      | Honoria     | 0.02 | 92.319  | 2.085   | 0.1109         | 0.0173          | 8.188  | -0.020 | 92.168  | 0.1104         | SL     | S    | L   | L   |     |     |
| 261      | Prymno      | 0.19 | 54.245  | 1.354   | 0.1006         | 0.0268          | 9.440  | 0.190  | 54.244  | 0.1005         | BX     | B    | X   |     |     |     |
| 266      | Aline       | 0.15 | 109.000 | 18.327  | 0.0597         | 0.0204          | 8.490  | 0.090  | 108.867 | 0.0599         | C      | C    | Ch  | Ch  | Caa | Ch  |
| 288      | Glauke      | 0.15 | 32.100  | 1.809   | 0.1722         | 0.0352          | 10.000 | 0.230  | 32.245  | 0.1699         | S      | S    | S   | S   |     |     |
| 317      | Roxane      | 0.15 | 19.859  | 0.124   | 0.5252         | 0.0787          | 10.070 | 0.490  | 20.410  | 0.3975         | EX     | E    | Xe  |     |     |     |
| 322      | Phaeo       | 0.15 | 73.155  | 0.000   | 0.0771         | 0.0000          | 8.990  | 0.090  | 73.123  | 0.0837         | XD     | X    | X   | D   |     |     |
| 335      | Roberta     | 0.15 | 89.703  | 1.491   | 0.0588         | 0.0113          | 8.860  | 0.130  | 89.734  | 0.0627         | BFP    | FP   | B   |     |     |     |
| 338      | Budrosa     | 0.15 | 65.783  | 0.505   | 0.1646         | 0.0277          | 8.370  | 0.230  | 66.350  | 0.1800         | MX     | M    | Xk  |     |     |     |
| 344      | Desiderata  | 0.15 | 125.970 | 1.377   | 0.0652         | 0.0183          | 8.030  | 0.090  | 125.870 | 0.0684         | C      | C    |     |     |     |     |
| 345      | Tercidina   | 0.10 | 99.000  | 11.469  | 0.0591         | 0.0120          | 8.810  | 0.210  | 99.109  | 0.0538         | C      | C    | Ch  | Ch  |     |     |
| 346      | Hermentaria | 0.15 | 91.810  | 1.424   | 0.2949         | 0.0657          | 7.250  | 0.230  | 91.912  | 0.2632         | S      | S    | S   | S   |     |     |
| 347      | Pariana     | 0.15 | 51.000  | 3.218   | 0.2130         | 0.0414          | 8.890  | 0.210  | 50.955  | 0.1891         | M      | M    |     |     |     |     |
| 379      | Huenna      | 0.15 | 87.472  | 2.359   | 0.0654         | 0.0079          | 8.990  | 0.140  | 87.336  | 0.0587         | CB     | B    | C   |     |     |     |
| 388      | Charybdis   | 0.07 | 124.202 | 2.315   | 0.0427         | 0.0070          | 8.580  | 0.070  | 124.195 | 0.0423         | C      | C    | C   |     | X   | X   |
| 392      | Wilhelmina  | 0.15 | 68.930  | 0.545   | 0.0542         | 0.0100          | 9.590  | 0.090  | 68.854  | 0.0543         | C      |      | Ch  |     |     |     |
| 423      | Diotima     | 0.15 | 177.254 | 6.297   | 0.0664         | 0.0049          | 7.320  | 0.090  | 177.011 | 0.0665         | C      | C    | C   |     |     |     |
| 429      | Lotis       | 0.15 | 70.000  | 6.683   | 0.0425         | 0.0141          | 9.890  | 0.070  | 69.888  | 0.0400         | C      | C    |     |     | X   | Xk  |
| 453      | Tea         | 0.15 | 26.139  | 0.398   | 0.1182         | 0.0162          | 10.850 | 0.230  | 26.223  | 0.1174         | S      | S    | S   | Sw  |     |     |
| 464      | Megaira     | 0.15 | 78.294  | 0.000   | 0.0421         | 0.0000          | 9.470  | 0.090  | 78.293  | 0.0469         | CFX    | FXU: | C   |     |     |     |
| 478      | Tergeste    | 0.15 | 77.252  | 1.447   | 0.1902         | 0.0282          | 7.960  | 0.230  | 77.714  | 0.1914         | SL     | S    | L   |     |     |     |
| 482      | Petrina     | 0.15 | 62.585  | 0.801   | 0.1320         | 0.0096          | 8.910  | 0.230  | 62.686  | 0.1227         | S      | S    |     |     |     |     |
| 486      | Cremona     | 0.15 | 19.007  | 0.238   | 0.1640         | 0.0199          | 10.880 | 0.230  | 19.317  | 0.2105         | -      |      |     |     |     |     |
| 488      | Kreusa      | 0.15 | 150.000 | 11.326  | 0.0590         | 0.0224          | 7.800  | 0.090  | 149.833 | 0.0597         | C      | C    |     |     | Caa | Ch  |
| 505      | Cava        | 0.03 | 105.000 | 4.488   | 0.0576         | 0.0232          | 8.640  | 0.010  | 104.935 | 0.0561         | CF     | FC   |     |     |     |     |
| 519      | Sylvania    | 0.15 | 43.944  | 0.524   | 0.2020         | 0.0423          | 9.180  | 0.230  | 44.114  | 0.1931         | S      | S    | S   |     |     |     |
| 539      | Pamina      | 0.15 | 43.724  | 0.359   | 0.1218         | 0.0149          | 10.040 | 0.090  | 43.361  | 0.0905         | C      |      | Ch  |     | Caa | Ch  |
| 540      | Rosamunde   | 0.15 | 20.274  | 0.118   | 0.2241         | 0.0519          | 10.740 | 0.230  | 20.368  | 0.2154         | S      | S    |     |     |     |     |
| 542      | Susanna     | 0.15 | 52.501  | 0.248   | 0.1158         | 0.0274          | 9.640  | 0.240  | 52.372  | 0.0897         | S      | S    |     |     |     |     |
| 556      | Phyllis     | 0.15 | 38.517  | 0.409   | 0.1787         | 0.0329          | 9.520  | 0.200  | 38.688  | 0.1836         | S      | S    | S   |     |     |     |
| 558      | Carmen      | 0.15 | 58.572  | 0.000   | 0.1170         | 0.0000          | 9.170  | 0.210  | 58.632  | 0.1104         | M      | M    |     |     | X   | Xk  |
| 560      | Delila      | 0.15 | 35.078  | 0.193   | 0.0627         | 0.0118          | 10.800 | 0.090  | 35.070  | 0.0687         | B      | ***  | B   |     |     |     |
| 584      | Semiramis   | 0.24 | 48.693  | 4.261   | 0.2444         | 0.0600          | 8.610  | 0.310  | 49.263  | 0.2618         | S      | S    | Sl  |     |     |     |
| 587      | Hypsipyple  | 0.15 | 12.944  | 0.103   | 0.1413         | 0.0237          | 12.190 | 0.230  | 12.991  | 0.1392         | -      |      |     |     |     |     |
| 593      | Titania     | 0.06 | 86.485  | 2.010   | 0.0458         | 0.0049          | 9.290  | 0.060  | 86.479  | 0.0454         | C      | C    |     |     |     |     |
| 606      | Brangane    | 0.15 | 36.907  | 0.744   | 0.0893         | 0.0116          | 10.200 | 0.090  | 36.960  | 0.1075         | SLDTK  | TSD  | K   | L   |     |     |
| 622      | Esther      | 0.15 | 29.000  | 5.417   | 0.1736         | 0.0621          | 10.240 | 0.230  | 29.104  | 0.1672         | S      | S    | S   |     |     |     |

Table 4: *cont.*

| Asteroid        | WISE |         |                 |                |              | H      | G     | Revised |                | Taxon. |     |     |     |     |     |     |
|-----------------|------|---------|-----------------|----------------|--------------|--------|-------|---------|----------------|--------|-----|-----|-----|-----|-----|-----|
|                 | G    | D (km)  | $\delta D$ (km) | p <sub>V</sub> | $\delta p_V$ |        |       | D (km)  | p <sub>V</sub> | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 674 Rachele     | 0.15 | 96.002  | 2.112           | 0.2064         | 0.0328       | 7.472  | 0.239 | 96.392  | 0.1951         | S      | S   | S   |     |     |     |     |
| 695 Bella       | 0.15 | 41.225  | 0.600           | 0.2449         | 0.0281       | 9.070  | 0.200 | 41.396  | 0.2427         | S      | S   |     |     |     |     |     |
| 712 Boliviana   | 0.03 | 127.576 | 3.737           | 0.0389         | 0.0051       | 8.330  | 0.030 | 127.806 | 0.0503         | CX     | C   | X   |     |     |     |     |
| 722 Frieda      | 0.15 | 8.835   | 0.044           | 0.3309         | 0.0429       | 12.310 | 0.230 | 8.794   | 0.2721         | S      |     |     | S   |     |     |     |
| 728 Leonisis    | 0.15 | 7.267   | 0.068           | 0.2557         | 0.0272       | 13.000 | 0.230 | 7.245   | 0.2123         | AL     |     |     |     | A   |     | Ld  |
| 739 Mandeville  | 0.15 | 103.713 | 2.286           | 0.0514         | 0.0086       | 8.760  | 0.090 | 103.604 | 0.0516         | X      | X   | X   | Xc  | X   |     | X   |
| 770 Bali        | 0.15 | 19.166  | 0.182           | 0.1732         | 0.0394       | 11.110 | 0.160 | 19.176  | 0.1728         | S      | S   |     |     |     |     |     |
| 776 Berbericia  | 0.34 | 151.113 | 4.099           | 0.0655         | 0.0077       | 7.632  | 0.140 | 150.522 | 0.0690         | C      | C   | Cgh | Cgh |     |     |     |
| 779 Nina        | 0.15 | 77.000  | 6.578           | 0.1740         | 0.0559       | 8.100  | 0.260 | 77.456  | 0.1694         | X      |     | X   |     | X   |     | X   |
| 782 Montefiore  | 0.15 | 14.541  | 0.099           | 0.2134         | 0.0286       | 11.560 | 0.230 | 14.578  | 0.1976         | S      | S   | Sl  | Sw  |     |     |     |
| 795 Fini        | 0.15 | 62.649  | 2.428           | 0.0593         | 0.0103       | 9.780  | 0.120 | 62.562  | 0.0553         | C      |     | C   |     |     |     |     |
| 823 Sisigambis  | 0.15 | 15.755  | 0.043           | 0.2339         | 0.0292       | 11.370 | 0.230 | 15.742  | 0.2018         | -      |     |     |     |     |     |     |
| 825 Tanina      | 0.15 | 14.611  | 0.068           | 0.1537         | 0.0333       | 11.840 | 0.230 | 14.667  | 0.1508         | S      | SR  | S   |     |     |     |     |
| 849 Ara         | 0.15 | 84.417  | 2.447           | 0.1155         | 0.0163       | 8.330  | 0.210 | 84.615  | 0.1149         | M      | M   |     |     |     |     |     |
| 851 Zeissia     | 0.15 | 13.566  | 0.106           | 0.2191         | 0.0225       | 11.600 | 0.230 | 13.649  | 0.2172         | S      | S   |     |     |     |     |     |
| 852 Wladilena   | 0.15 | 31.087  | 0.278           | 0.1597         | 0.0184       | 10.150 | 0.140 | 31.067  | 0.1594         | -      |     |     |     |     |     |     |
| 853 Nansenia    | 0.15 | 30.737  | 0.314           | 0.0323         | 0.0027       | 11.690 | 0.090 | 30.755  | 0.0394         | CXD    | XD  | Ch  |     |     |     |     |
| 901 Brunsia     | 0.15 | 14.721  | 0.108           | 0.1888         | 0.0330       | 11.610 | 0.230 | 14.784  | 0.1834         | S      | S   |     |     |     |     |     |
| 905 Universitas | 0.15 | 13.703  | 0.090           | 0.2188         | 0.0619       | 11.660 | 0.090 | 13.605  | 0.2068         | S      |     | S   |     |     |     |     |
| 920 Rogeria     | 0.15 | 29.683  | 0.260           | 0.0670         | 0.0030       | 11.285 | 0.240 | 29.706  | 0.0613         | DT     | DTU |     |     |     |     |     |
| 925 Alphonsina  | 0.15 | 58.000  | 4.841           | 0.2533         | 0.0534       | 8.410  | 0.230 | 58.062  | 0.2266         | S      | S   | S   | S   |     |     |     |
| 929 Algunde     | 0.15 | 12.440  | 0.073           | 0.2348         | 0.0327       | 11.860 | 0.240 | 12.448  | 0.2055         | S      |     | S   | S   |     | S   | Sl  |
| 968 Petunia     | 0.15 | 28.983  | 0.263           | 0.1657         | 0.0703       | 10.250 | 0.230 | 29.123  | 0.1654         | S      | S   |     |     | S   |     | Sl  |
| 980 Anacostia   | 0.06 | 95.568  | 1.195           | 0.1404         | 0.0125       | 7.855  | 0.060 | 95.553  | 0.1395         | SL     | SU  | L   |     |     |     |     |
| 1060 Magnolia   | 0.15 | 7.110   | 0.117           | 0.2922         | 0.0328       | 12.710 | 0.230 | 7.160   | 0.2839         | S      |     |     |     | S   |     | S   |
| 1078 Mentha     | 0.15 | 13.660  | 0.134           | 0.1819         | 0.0375       | 11.900 | 0.230 | 13.675  | 0.1641         | S      | S   |     |     |     |     |     |
| 1083 Salvia     | 0.15 | 10.183  | 0.000           | 0.1945         | 0.0000       | 12.250 | 0.230 | 10.283  | 0.2103         | -      |     |     |     |     |     |     |
| 1088 Mitaka     | 0.15 | 15.957  | 0.030           | 0.1588         | 0.0204       | 11.620 | 0.230 | 16.016  | 0.1549         | S      | S   | S   |     |     |     |     |
| 1103 Sequoia    | 0.15 | 7.623   | 0.058           | 0.3044         | 0.0439       | 12.530 | 0.420 | 7.816   | 0.2813         | EX     | E   | Xk  |     |     |     |     |
| 1117 Reginita   | 0.15 | 10.193  | 0.250           | 0.3585         | 0.0785       | 11.690 | 0.230 | 10.292  | 0.3516         | S      |     |     |     | S   |     | S   |
| 1123 Shapleya   | 0.15 | 11.939  | 0.000           | 0.2642         | 0.0000       | 11.590 | 0.230 | 12.084  | 0.2797         | S      |     |     |     | S   |     | S   |
| 1338 Duponta    | 0.15 | 7.875   | 0.062           | 0.2286         | 0.0274       | 12.798 | 0.200 | 7.885   | 0.2159         | -      |     |     |     |     |     |     |
| 1367 Nongoma    | 0.15 | 9.313   | 0.048           | 0.2470         | 0.0271       | 12.300 | 0.230 | 9.371   | 0.2418         | SL     |     |     |     | S   |     | L   |
| 1376 Michelle   | 0.15 | 7.053   | 0.119           | 0.2669         | 0.0578       | 12.810 | 0.230 | 7.104   | 0.2630         | -      |     |     |     |     |     |     |
| 1405 Sibelius   | 0.15 | 7.175   | 0.089           | 0.3516         | 0.0646       | 12.570 | 0.240 | 7.204   | 0.3191         | -      |     |     |     |     |     |     |
| 1419 Danzig     | 0.15 | 14.059  | 0.096           | 0.2388         | 0.0462       | 11.450 | 0.230 | 14.139  | 0.2324         | -      |     |     |     |     |     |     |
| 1429 Pemba      | 0.15 | 10.417  | 0.000           | 0.1709         | 0.0000       | 12.740 | 0.230 | 10.371  | 0.1316         | -      |     |     |     |     |     |     |
| 1472 Muonio     | 0.15 | 8.388   | 0.110           | 0.2397         | 0.0786       | 12.620 | 0.240 | 8.421   | 0.2230         | -      |     |     |     |     |     |     |
| 1629 Pecker     | 0.15 | 9.297   | 0.036           | 0.2618         | 0.0344       | 12.360 | 0.240 | 9.310   | 0.2318         | S      |     | S   |     |     |     |     |
| 1644 Rafita     | 0.15 | 15.443  | 0.000           | 0.1392         | 0.0000       | 11.860 | 0.230 | 15.482  | 0.1329         | S      | S   |     |     |     |     |     |
| 1665 Gaby       | 0.15 | 10.960  | 0.021           | 0.2681         | 0.0736       | 11.900 | 0.230 | 11.009  | 0.2532         | S      | S   |     |     | S   |     | Sq  |
| 1689 Floris-Jan | 0.15 | 16.122  | 4.950           | 0.1271         | 0.0508       | 11.740 | 0.230 | 16.213  | 0.1353         |        |     |     |     | D   |     | D   |
| 1717 Arlon      | 0.15 | 9.128   | 0.166           | 0.2492         | 0.0420       | 12.430 | 0.240 | 9.150   | 0.2250         | S      | S   |     |     |     |     |     |
| 1718 Namibia    | 0.15 | 9.747   | 0.112           | 0.0740         | 0.0095       | 13.800 | 0.050 | 9.694   | 0.0568         | -      |     |     |     |     |     |     |

Table 4: *cont.*

| Asteroid            | WISE     |               |                 |                      |              | <i>H</i> | <i>G</i> | Revised       |                      | Taxon. |     |     |     |     |     |     |
|---------------------|----------|---------------|-----------------|----------------------|--------------|----------|----------|---------------|----------------------|--------|-----|-----|-----|-----|-----|-----|
|                     | <i>G</i> | <i>D</i> (km) | $\delta D$ (km) | <i>p<sub>V</sub></i> | $\delta p_V$ |          |          | <i>D</i> (km) | <i>p<sub>V</sub></i> | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 1722 Goffin         | 0.15     | 10.446        | 0.130           | 0.2191               | 0.0165       | 12.180   | 0.150    | 10.442        | 0.2175               | S      |     |     |     | S   |     |     |
| 1736 Floirac        | 0.15     | 8.701         | 0.119           | 0.2994               | 0.0420       | 12.330   | 0.240    | 8.729         | 0.2711               | -      |     |     |     |     |     |     |
| 1777 Gehrels        | 0.15     | 12.486        | 0.228           | 0.2212               | 0.0170       | 11.773   | 0.343    | 12.667        | 0.2151               | S      |     | Sq  |     |     |     |     |
| 1806 Derice         | 0.15     | 10.697        | 0.061           | 0.2474               | 0.0669       | 12.140   | 0.240    | 10.700        | 0.2149               | S      |     |     |     |     | S   | Sl  |
| 1830 Pogson         | 0.15     | 8.284         | 0.116           | 0.2361               | 0.0396       | 12.659   | 0.291    | 8.350         | 0.2188               | S      | S   | S   |     |     |     |     |
| 1865 Cerberus       | 0.15     | 1.611         | 0.013           | 0.1360               | 0.0210       | 16.965   | 0.232    | 1.608         | 0.1118               | S      | S   | S   |     |     |     |     |
| 1866 Sisypheus      | 0.15     | 6.597         | 0.189           | 0.2550               | 0.0490       | 12.510   | 0.235    | 6.859         | 0.3719               | S      |     | S   | Sw  |     |     |     |
| 1967 Menzel         | 0.15     | 10.138        | 0.092           | 0.2279               | 0.0397       | 12.250   | 0.240    | 10.182        | 0.2145               | S      |     |     |     | S   |     |     |
| 1979 Sakharov       | 0.15     | 4.521         | 0.000           | 0.3574               | 0.0000       | 13.800   | 0.340    | 4.512         | 0.2620               | -      |     |     |     |     |     |     |
| 1980 Tezcatlipoca   | 0.15     | 5.988         | 0.000           | 0.1373               | 0.0000       | 13.960   | 0.230    | 5.998         | 0.1279               | SA     | SU  | Sl  | Sw  |     | A   | A   |
| 1991 Darwin         | 0.15     | 4.989         | 0.371           | 0.2577               | 0.0777       | 13.600   | 0.230    | 5.024         | 0.2541               | -      |     |     |     |     |     |     |
| 2002 Euler          | 0.15     | 19.773        | 0.057           | 0.0416               | 0.0062       | 12.700   | 0.240    | 19.780        | 0.0375               | -      |     |     |     |     |     |     |
| 2006 Polonskaya     | 0.15     | 4.625         | 0.163           | 0.3539               | 0.0955       | 13.350   | 0.420    | 4.804         | 0.3498               | -      |     |     |     |     |     |     |
| 2049 Grietje        | 0.15     | 2.457         | 0.126           | 0.1684               | 0.0316       | 15.600   | 0.420    | 2.495         | 0.1633               | -      |     |     |     |     |     |     |
| 2094 Magnitka       | 0.15     | 12.053        | 0.055           | 0.1278               | 0.0129       | 12.490   | 0.400    | 12.167        | 0.1204               | -      |     |     |     |     |     |     |
| 2110 Moore-Sitterly | 0.15     | 5.699         | 0.000           | 0.1649               | 0.0000       | 13.620   | 0.240    | 5.765         | 0.1894               | -      |     |     |     |     |     |     |
| 2121 Sevastopol     | 0.15     | 9.318         | 0.037           | 0.2475               | 0.0223       | 12.480   | 0.290    | 9.337         | 0.2064               | S      |     |     |     |     | S   | Sl  |
| 2212 Hephaistos     | 0.15     | 5.536         | 0.044           | 0.1630               | 0.0270       | 13.525   | 0.230    | 5.636         | 0.2163               | SG     | SG  |     |     |     |     |     |
| 2478 Tokai          | 0.15     | 9.982         | 0.031           | 0.2084               | 0.0371       | 12.370   | 0.330    | 10.087        | 0.1957               | S      |     | S   |     |     | S   | Sl  |
| 2486 Metsahovi      | 0.15     | 8.417         | 0.034           | 0.2321               | 0.0232       | 12.782   | 0.240    | 8.401         | 0.1929               | -      |     |     |     |     |     |     |
| 2501 Lohja          | 0.15     | 11.822        | 0.072           | 0.1898               | 0.0440       | 12.155   | 0.234    | 11.843        | 0.1731               | A      | A   | A   | A   |     |     |     |
| 2544 Gubarev        | 0.15     | 9.261         | 0.290           | 0.2476               | 0.0273       | 12.350   | 0.240    | 9.308         | 0.2341               | -      |     |     |     |     |     |     |
| 2642 Vesale         | 0.15     | 9.541         | 0.053           | 0.2044               | 0.0224       | 12.450   | 0.230    | 9.592         | 0.2010               | -      |     |     |     |     |     |     |
| 2659 Millis         | 0.15     | 27.878        | 0.337           | 0.0498               | 0.0028       | 11.650   | 0.090    | 27.849        | 0.0498               | B      |     | B   |     |     |     |     |
| 2794 Kulik          | 0.15     | 7.622         | 0.088           | 0.1238               | 0.0247       | 13.480   | 0.230    | 7.647         | 0.1225               | -      |     |     |     |     |     |     |
| 2815 Soma           | 0.15     | 7.158         | 0.088           | 0.3207               | 0.0411       | 12.980   | 0.240    | 7.067         | 0.2273               | S      |     |     |     |     | S   | S   |
| 2830 Greenwich      | 0.15     | 9.197         | 0.064           | 0.1846               | 0.0451       | 12.610   | 0.230    | 9.252         | 0.1865               | S      | S   |     |     |     |     |     |
| 2886 Tinkaping      | 0.15     | 5.784         | 0.053           | 0.2574               | 0.0217       | 13.280   | 0.230    | 5.825         | 0.2538               | -      |     |     |     |     |     |     |
| 2897 Ole Romer      | 0.15     | 5.231         | 0.113           | 0.2827               | 0.0679       | 13.640   | 0.240    | 5.209         | 0.2278               | -      |     |     |     |     |     |     |
| 2943 Heinrich       | 0.15     | 7.668         | 0.046           | 0.2295               | 0.0291       | 12.820   | 0.240    | 7.712         | 0.2212               | -      |     |     |     |     |     |     |
| 2954 Delsemme       | 0.15     | 5.030         | 0.037           | 0.2590               | 0.0484       | 13.580   | 0.230    | 5.065         | 0.2547               | -      |     |     |     |     |     |     |
| 3066 McFadden       | 0.15     | 14.805        | 0.051           | 0.2617               | 0.0766       | 11.240   | 0.230    | 14.896        | 0.2541               | SL     |     |     |     |     | S   | L   |
| 3116 Goodricke      | 0.15     | 7.856         | 0.107           | 0.2574               | 0.0267       | 12.620   | 0.230    | 7.909         | 0.2528               | S      |     |     |     |     | S   | Sl  |
| 3121 Tamines        | 0.15     | 6.059         | 0.132           | 0.2101               | 0.0552       | 13.460   | 0.300    | 6.107         | 0.1956               | S      |     | S   |     |     |     |     |
| 3122 Florence       | 0.15     | 4.401         | 0.030           | 0.2310               | 0.0490       | 14.515   | 0.266    | 4.349         | 0.1460               | S      |     | S   | Sqw |     |     |     |
| 3376 Armandhammer   | 0.15     | 8.168         | 0.098           | 0.2761               | 0.0356       | 12.540   | 0.240    | 8.199         | 0.2533               | S      |     | Sq  |     |     |     |     |
| 3554 Amun           | 0.15     | 3.332         | 0.000           | 0.0775               | 0.0000       | 15.870   | 0.260    | 3.337         | 0.0712               | -      |     |     |     |     |     |     |
| 3576 Galina         | 0.15     | 7.802         | 0.074           | 0.1675               | 0.0310       | 13.200   | 0.240    | 7.815         | 0.1518               | S      |     | Sl  |     |     |     |     |
| 3673 Levy           | 0.15     | 6.412         | 0.159           | 0.2472               | 0.0325       | 13.140   | 0.280    | 6.468         | 0.2341               | -      |     |     |     |     |     |     |
| 3691 Bede           | 0.15     | 1.803         | 0.105           | 0.5930               | 0.1200       | 15.220   | 0.430    | 1.827         | 0.4323               | Xc     |     | Xc  |     |     |     |     |
| 3752 Camillo        | 0.15     | 2.306         | 0.088           | 0.2100               | 0.0360       | 15.410   | 0.230    | 2.328         | 0.2234               | -      |     |     |     |     |     |     |
| 3824 Brendalee      | 0.15     | 5.183         | 0.107           | 0.2570               | 0.0413       | 13.520   | 0.230    | 5.219         | 0.2534               | S      |     | S   |     |     |     |     |
| 3868 Mendoza        | 0.15     | 9.351         | 0.049           | 0.1621               | 0.0288       | 12.710   | 0.220    | 9.396         | 0.1649               | -      |     |     |     |     |     |     |
| 3888 Hoyt           | 0.15     | 6.659         | 0.045           | 0.4011               | 0.0899       | 13.260   | 0.240    | 6.430         | 0.2122               | S      |     |     |     |     | S   | Sq  |

Table 4: *cont.*

| Asteroid         | WISE     |               |                 |                      |              | <i>H</i> | <i>G</i> | Revised       |                      | Taxon. |     |     |     |     |     |     |
|------------------|----------|---------------|-----------------|----------------------|--------------|----------|----------|---------------|----------------------|--------|-----|-----|-----|-----|-----|-----|
|                  | <i>G</i> | <i>D</i> (km) | $\delta D$ (km) | <i>p<sub>V</sub></i> | $\delta p_V$ |          |          | <i>D</i> (km) | <i>p<sub>V</sub></i> | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 3896 Pordenone   | 0.15     | 20.001        | 0.104           | 0.1341               | 0.0102       | 11.610   | 0.240    | 19.930        | 0.1009               | -      |     |     |     |     |     |     |
| 3918 Brel        | 0.15     | 6.262         | 0.129           | 0.2894               | 0.0182       | 13.030   | 0.240    | 6.299         | 0.2732               | -      |     |     |     |     |     |     |
| 3928 Randa       | 0.15     | 5.733         | 0.175           | 0.2572               | 0.0392       | 13.650   | 0.240    | 5.686         | 0.1894               | -      |     |     |     |     |     |     |
| 3982 Kastel'     | 0.15     | 6.790         | 0.363           | 0.2010               | 0.0310       | 13.350   | 0.510    | 6.901         | 0.1695               | -      |     |     |     |     |     |     |
| 4029 Bridges     | 0.15     | 7.897         | 0.000           | 0.2063               | 0.0000       | 12.960   | 0.240    | 7.910         | 0.1848               | -      |     |     |     |     |     |     |
| 4197 1982 TA     | 0.15     | 3.043         | 0.156           | 0.2760               | 0.0770       | 14.800   | 0.010    | 2.981         | 0.2389               | S      |     | Sq  | Sq  |     |     |     |
| 4285 Hulkower    | 0.15     | 7.787         | 0.119           | 0.2092               | 0.0225       | 12.960   | 0.240    | 7.804         | 0.1898               | -      |     |     |     |     |     |     |
| 4483 Petofi      | 0.15     | 5.545         | 0.030           | 0.2150               | 0.0575       | 13.570   | 0.420    | 5.653         | 0.2063               |        |     |     |     | X   |     | X   |
| 4533 Orth        | 0.15     | 7.526         | 0.094           | 0.2369               | 0.0342       | 13.140   | 0.370    | 7.529         | 0.1728               | S      |     |     |     | S   |     | S   |
| 4555 1987 QL     | 0.15     | 3.126         | 0.111           | 0.3641               | 0.0623       | 14.280   | 0.300    | 3.174         | 0.3403               | -      |     |     |     |     |     |     |
| 4638 Estens      | 0.15     | 4.595         | 0.404           | 0.2101               | 0.0617       | 13.950   | 0.240    | 4.635         | 0.2163               | -      |     |     |     |     |     |     |
| 4666 Dietz       | 0.15     | 6.827         | 0.294           | 0.2391               | 0.0655       | 13.160   | 0.240    | 6.826         | 0.2064               |        |     |     |     | D   |     | D   |
| 4674 Pauling     | 0.15     | 4.684         | 0.046           | 0.3872               | 0.0810       | 14.245   | 0.330    | 4.520         | 0.1733               | -      |     |     |     |     |     |     |
| 4786 Tatianina   | 0.15     | 3.282         | 0.197           | 0.5136               | 0.1593       | 13.718   | 0.460    | 3.475         | 0.4763               | Xc     |     | Xc  |     |     |     |     |
| 4951 Iwamoto     | 0.15     | 5.515         | 0.033           | 0.1859               | 0.0324       | 13.740   | 0.190    | 5.528         | 0.1844               | S      |     | S   |     |     |     |     |
| 5080 Oja         | 0.15     | 8.377         | 0.000           | 0.1818               | 0.0000       | 13.010   | 0.240    | 8.377         | 0.1573               | -      |     |     |     |     |     |     |
| 5129 Groom       | 0.15     | 8.189         | 0.109           | 0.2922               | 0.0508       | 13.060   | 0.160    | 7.974         | 0.1659               | -      |     |     |     |     |     |     |
| 5143 Heracles    | 0.15     | 4.843         | 0.378           | 0.2270               | 0.0540       | 14.270   | 0.420    | 4.833         | 0.1481               | QVO    |     | O   | Q   | V   |     |     |
| 5313 Nunes       | 0.15     | 5.457         | 0.233           | 0.2839               | 0.0316       | 13.780   | 0.240    | 5.378         | 0.1878               | -      |     |     |     |     |     |     |
| 5342 Le Poole    | 0.15     | 5.194         | 0.281           | 0.2607               | 0.0440       | 14.120   | 0.240    | 5.101         | 0.1527               | -      |     |     |     |     |     |     |
| 5440 Terao       | 0.15     | 5.711         | 0.020           | 0.1814               | 0.0144       | 13.770   | 0.240    | 5.726         | 0.1673               | -      |     |     |     |     |     |     |
| 5451 Plato       | 0.15     | 8.703         | 0.206           | 0.0534               | 0.0098       | 14.580   | 0.240    | 8.680         | 0.0345               | -      |     |     |     |     |     |     |
| 5477 Holmes      | 0.15     | 3.147         | 0.137           | 0.3100               | 0.0380       | 14.445   | 0.390    | 3.215         | 0.2849               | -      |     |     |     |     |     |     |
| 5484 Inoda       | 0.15     | 10.524        | 0.037           | 0.0944               | 0.0145       | 13.170   | 0.240    | 10.535        | 0.0859               | -      |     |     |     |     |     |     |
| 5645 1990 SP     | 0.15     | 1.668         | 0.018           | 0.1210               | 0.0220       | 17.240   | 0.000    | 1.648         | 0.0827               | -      |     |     |     |     |     |     |
| 5653 Camarillo   | 0.15     | 1.537         | 0.016           | 0.2710               | 0.0570       | 16.420   | 0.240    | 1.526         | 0.2052               | -      |     |     |     |     |     |     |
| 5736 Sanford     | 0.15     | 5.060         | 0.105           | 0.2504               | 0.0348       | 14.170   | 0.240    | 4.981         | 0.1529               | -      |     |     |     |     |     |     |
| 5905 Johnson     | 0.15     | 4.791         | 0.065           | 0.1939               | 0.0278       | 14.255   | 0.330    | 4.797         | 0.1524               | -      |     |     |     |     |     |     |
| 5985 1942 RJ     | 0.15     | 6.212         | 0.255           | 0.1944               | 0.0259       | 13.530   | 0.240    | 6.225         | 0.1765               | -      |     |     |     |     |     |     |
| 6084 Bascom      | 0.15     | 6.347         | 0.218           | 0.2197               | 0.0299       | 13.290   | 0.260    | 6.388         | 0.2091               | S      |     |     |     | S   |     | S   |
| 6178 1986 DA     | 0.15     | 3.199         | 0.207           | 0.1610               | 0.0340       | 15.900   | 0.200    | 3.149         | 0.0778               | -      |     |     |     |     |     |     |
| 6185 1987 YD     | 0.15     | 9.930         | 0.000           | 0.0755               | 0.0000       | 13.480   | 0.240    | 9.947         | 0.0724               | -      |     |     |     |     |     |     |
| 6361 1978 VL11   | 0.15     | 3.714         | 0.000           | 0.4099               | 0.0000       | 13.860   | 0.240    | 3.724         | 0.3639               | -      |     |     |     |     |     |     |
| 6405 Komiyama    | 0.15     | 6.529         | 0.120           | 0.2626               | 0.0509       | 13.430   | 0.240    | 6.453         | 0.1801               | -      |     |     |     |     |     |     |
| 6453 1991 NY     | 0.15     | 8.520         | 0.329           | 0.0883               | 0.0176       | 13.810   | 0.240    | 8.513         | 0.0729               | -      |     |     |     |     |     |     |
| 6455 1992 HE     | 0.15     | 4.626         | 0.407           | 0.2270               | 0.0510       | 14.215   | 0.340    | 4.625         | 0.1701               | S      |     | S   | Srw |     |     |     |
| 6708 Bobbievaile | 0.15     | 9.226         | 0.021           | 0.1031               | 0.0203       | 13.290   | 0.240    | 9.249         | 0.0997               | -      |     |     |     |     |     |     |
| 6949 Zissell     | 0.15     | 8.184         | 0.058           | 0.0747               | 0.0052       | 14.000   | 0.240    | 8.187         | 0.0662               | -      |     |     |     |     |     |     |
| 7020 Yourcenar   | 0.15     | 9.061         | 0.121           | 0.0712               | 0.0077       | 14.290   | 0.240    | 9.019         | 0.0418               | -      |     |     |     |     |     |     |
| 7030 Colombini   | 0.15     | 6.529         | 0.479           | 0.0740               | 0.0079       | 14.480   | 0.240    | 6.533         | 0.0668               | -      |     |     |     |     |     |     |
| 7033 1994 WN2    | 0.15     | 4.741         | 0.121           | 0.2184               | 0.0676       | 14.000   | 0.240    | 4.750         | 0.1966               | -      |     |     |     |     |     |     |
| 7043 Godart      | 0.15     | 5.721         | 0.136           | 0.2250               | 0.0417       | 13.490   | 0.330    | 5.788         | 0.2118               | -      |     |     |     |     |     |     |
| 7089 1992 FX1    | 0.15     | 5.011         | 0.055           | 0.3085               | 0.0270       | 14.050   | 0.240    | 4.898         | 0.1766               | -      |     |     |     |     |     |     |
| 7116 Mentall     | 0.15     | 7.412         | 0.048           | 0.1524               | 0.0277       | 13.540   | 0.240    | 7.398         | 0.1238               | -      |     |     |     |     |     |     |

Table 4: *cont.*

| Asteroid | WISE          |          |                 |       |              | $H$    | $G$    | Revised  |        | Taxon. |     |     |     |     |     |     |
|----------|---------------|----------|-----------------|-------|--------------|--------|--------|----------|--------|--------|-----|-----|-----|-----|-----|-----|
|          | $G$           | $D$ (km) | $\delta D$ (km) | $p_V$ | $\delta p_V$ |        |        | $D$ (km) | $p_V$  | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 7225     | Huntress      | 0.15     | 6.680           | 0.224 | 0.1650       | 0.0163 | 13.490 | 0.360    | 6.748  | 0.1558 | S   |     |     | S   |     |     |
| 7229     | Tonimore      | 0.15     | 4.840           | 0.235 | 0.0434       | 0.0082 | 15.600 | 0.230    | 4.846  | 0.0433 | -   |     |     |     |     |     |
| 7735     | Scorzelli     | 0.15     | 6.719           | 0.150 | 0.4704       | 0.0735 | 13.100 | 0.120    | 6.371  | 0.2504 | -   |     |     |     |     |     |
| 8033     | 1992 FY1      | 0.15     | 6.498           | 0.059 | 0.1581       | 0.0150 | 13.640 | 0.240    | 6.512  | 0.1457 | -   |     |     |     |     |     |
| 8116     | Jeanperrin    | 0.15     | 4.773           | 0.075 | 0.1859       | 0.0353 | 14.050 | 0.230    | 4.797  | 0.1841 | -   |     |     |     |     |     |
| 8195     | 1993 UC1      | 0.15     | 8.137           | 0.170 | 0.2043       | 0.0203 | 12.900 | 0.240    | 8.152  | 0.1839 | -   |     |     |     |     |     |
| 8338     | Ralhan        | 0.15     | 4.791           | 0.210 | 0.3359       | 0.0711 | 14.020 | 0.240    | 4.680  | 0.1988 | -   |     |     |     |     |     |
| 8356     | Wadhwa        | 0.15     | 6.745           | 0.310 | 0.2945       | 0.0822 | 13.070 | 0.240    | 6.707  | 0.2323 | -   |     |     |     |     |     |
| 9260     | Edwardolson   | 0.15     | 4.115           | 0.362 | 0.2620       | 0.0369 | 14.540 | 0.240    | 4.052  | 0.1643 | -   |     |     |     |     |     |
| 9556     | Gaywray       | 0.15     | 6.587           | 0.070 | 0.2349       | 0.0547 | 13.710 | 0.240    | 6.482  | 0.1379 | -   |     |     |     |     |     |
| 9617     | Grahamchapman | 0.15     | 2.840           | 0.382 | 0.2445       | 0.0393 | 14.970 | 0.240    | 2.849  | 0.2237 | -   |     |     |     |     |     |
| 9782     | Edo           | 0.15     | 6.012           | 0.113 | 0.2133       | 0.0211 | 13.480 | 0.240    | 6.031  | 0.1969 | -   |     |     |     |     |     |
| 9948     | 1990 QB2      | 0.15     | 3.345           | 0.717 | 0.2502       | 0.0931 | 14.620 | 0.240    | 3.351  | 0.2232 | -   |     |     |     |     |     |
| 10123    | Fideoja       | 0.15     | 3.476           | 0.518 | 0.4414       | 0.0940 | 14.530 | 0.240    | 3.350  | 0.2426 | -   |     |     |     |     |     |
| 10188    | Yasuoyoneda   | 0.15     | 5.407           | 0.195 | 0.2193       | 0.0350 | 14.030 | 0.240    | 5.355  | 0.1505 | -   |     |     |     |     |     |
| 10208    | Germanicus    | 0.15     | 3.552           | 0.202 | 0.2667       | 0.0266 | 14.790 | 0.240    | 3.503  | 0.1747 | -   |     |     |     |     |     |
| 10484    | Hecht         | 0.15     | 4.623           | 0.552 | 0.2276       | 0.0603 | 14.180 | 0.240    | 4.601  | 0.1776 | -   |     |     |     |     |     |
| 11072    | Hiraoka       | 0.15     | 9.083           | 0.041 | 0.0853       | 0.0247 | 13.720 | 0.240    | 9.074  | 0.0697 | -   |     |     |     |     |     |
| 11271    | 1988 KB       | 0.15     | 7.341           | 0.016 | 0.1980       | 0.0358 | 13.170 | 0.240    | 7.350  | 0.1764 | -   |     |     |     |     |     |
| 11398    | 1998 YP11     | 0.15     | 1.316           | 0.349 | 0.3180       | 0.0950 | 16.590 | 0.290    | 1.310  | 0.2381 | -   |     |     |     |     |     |
| 11500    | Tomaiyowit    | 0.15     | 0.738           | 0.006 | 0.1420       | 0.0240 | 18.490 | 0.190    | 0.738  | 0.1304 | S   |     |     | S   |     |     |
| 12466    | 1997 AS12     | 0.15     | 4.701           | 0.260 | 0.1831       | 0.0267 | 14.210 | 0.240    | 4.709  | 0.1649 | -   |     |     |     |     |     |
| 12923    | Zephyr        | 0.15     | 2.060           | 0.013 | 0.1990       | 0.0340 | 15.930 | 0.240    | 2.062  | 0.1764 | -   |     |     |     |     |     |
| 13144    | 1995 BJ       | 0.15     | 7.773           | 0.248 | 0.1682       | 0.0222 | 13.400 | 0.120    | 7.701  | 0.1300 | -   |     |     |     |     |     |
| 13154    | Petermrva     | 0.15     | 4.170           | 0.239 | 0.1523       | 0.0199 | 14.600 | 0.200    | 4.176  | 0.1464 | -   |     |     |     |     |     |
| 15350    | Naganuma      | 0.15     | 4.357           | 0.070 | 0.2563       | 0.0380 | 14.160 | 0.240    | 4.337  | 0.2035 | -   |     |     |     |     |     |
| 15793    | 1993 TG19     | 0.15     | 3.497           | 0.926 | 0.1317       | 0.0916 | 15.460 | 0.240    | 3.482  | 0.0954 | -   |     |     |     |     |     |
| 16064    | 1999 RH27     | 0.15     | 4.106           | 0.592 | 0.0200       | 0.0060 | 16.560 | -0.140   | 4.100  | 0.0250 | -   |     |     |     |     |     |
| 16115    | 1999 XH25     | 0.15     | 12.529          | 0.148 | 0.0710       | 0.0144 | 13.280 | 0.120    | 12.482 | 0.0553 | -   |     |     |     |     |     |
| 16173    | 2000 AC98     | 0.15     | 3.879           | 0.122 | 0.2059       | 0.0413 | 14.430 | 0.270    | 3.905  | 0.1958 | -   |     |     |     |     |     |
| 16403    | 1984 WJ1      | 0.15     | 4.147           | 0.115 | 0.3401       | 0.0193 | 13.740 | 0.370    | 4.238  | 0.3138 | -   |     |     |     |     |     |
| 16691    | 1994 VS       | 0.15     | 2.671           | 0.602 | 0.2476       | 0.0448 | 15.010 | 0.240    | 2.690  | 0.2419 | -   |     |     |     |     |     |
| 17060    | Mikecombi     | 0.15     | 5.164           | 0.382 | 0.2405       | 0.0526 | 14.020 | 0.240    | 5.111  | 0.1667 | -   |     |     |     |     |     |
| 17470    | 1991 BX       | 0.15     | 11.699          | 0.373 | 0.1177       | 0.0194 | 13.280 | 0.120    | 11.565 | 0.0644 | -   |     |     |     |     |     |
| 17479    | 1991 PV9      | 0.15     | 6.352           | 0.429 | 0.2298       | 0.0537 | 13.640 | 0.240    | 6.286  | 0.1564 | -   |     |     |     |     |     |
| 17938    | Tamsendrew    | 0.15     | 3.224           | 0.119 | 0.2043       | 0.0338 | 14.870 | 0.240    | 3.235  | 0.1902 | -   |     |     |     |     |     |
| 18096    | 2000 LM16     | 0.15     | 7.356           | 0.109 | 0.1185       | 0.0171 | 13.960 | 0.120    | 7.301  | 0.0864 | -   |     |     |     |     |     |
| 18503    | 1996 PY4      | 0.15     | 3.529           | 0.047 | 0.4290       | 0.0331 | 14.510 | 0.240    | 3.408  | 0.2388 | -   |     |     |     |     |     |
| 19763    | Klimesh       | 0.15     | 7.270           | 0.138 | 0.1754       | 0.0464 | 13.270 | 0.240    | 7.291  | 0.1635 | -   |     |     |     |     |     |
| 19764    | 2000 NF5      | 0.15     | 1.572           | 0.071 | 0.3420       | 0.0770 | 16.280 | 0.300    | 1.552  | 0.2256 | -   |     |     |     |     |     |
| 20031    | 1992 OO       | 0.15     | 4.772           | 0.037 | 0.4481       | 0.0655 | 13.850 | 0.240    | 4.591  | 0.2417 | -   |     |     |     |     |     |
| 20932    | 2258 T-1      | 0.15     | 5.234           | 0.000 | 0.3276       | 0.0000 | 13.780 | 0.240    | 5.132  | 0.2063 | -   |     |     |     |     |     |
| 21088    | 1992 BL2      | 0.15     | 4.231           | 0.113 | 0.2060       | 0.0490 | 14.350 | 0.240    | 4.232  | 0.1794 | -   |     |     |     |     |     |
| 21720    | Pilishvili    | 0.15     | 3.163           | 0.150 | 0.2328       | 0.0221 | 15.140 | 0.240    | 3.130  | 0.1585 | -   |     |     |     |     |     |

Table 4: *cont.*

| Asteroid |              | WISE |        |                 |                |              | H      | G     | Revised |                | Taxon. |     |     |     |     |     |     |
|----------|--------------|------|--------|-----------------|----------------|--------------|--------|-------|---------|----------------|--------|-----|-----|-----|-----|-----|-----|
|          |              | G    | D (km) | $\delta D$ (km) | p <sub>V</sub> | $\delta p_V$ |        |       | D (km)  | p <sub>V</sub> | (0)    | (1) | (2) | (3) | (4) | (5) | (6) |
| 22166    | 2000 WX154   | 0.15 | 4.715  | 0.280           | 0.1995         | 0.0431       | 15.020 | 0.240 | 4.613   | 0.0815         | -      |     |     |     |     |     |     |
| 23971    | 1998 YU9     | 0.15 | 8.152  | 0.094           | 0.0410         | 0.0011       | 14.570 | 0.120 | 8.146   | 0.0395         | -      |     |     |     |     |     |     |
| 23979    | 1999 JL82    | 0.15 | 4.899  | 0.390           | 0.2930         | 0.0772       | 13.900 | 0.240 | 4.842   | 0.2075         | -      |     |     |     |     |     |     |
| 24114    | 1999 VV23    | 0.15 | 4.967  | 0.170           | 0.4119         | 0.0589       | 13.520 | 0.240 | 4.880   | 0.2898         | -      |     |     |     |     |     |     |
| 26045    | 1582 T-2     | 0.15 | 2.078  | 0.559           | 0.1959         | 0.0702       | 15.840 | 0.240 | 2.087   | 0.1871         | -      |     |     |     |     |     |     |
| 26760    | 2001 KP41    | 0.15 | 5.400  | 0.374           | 0.0420         | 0.0100       | 15.580 | 0.050 | 5.387   | 0.0357         | -      |     |     |     |     |     |     |
| 29168    | 1990 KJ      | 0.15 | 4.927  | 0.343           | 0.3483         | 0.0596       | 13.840 | 0.240 | 4.826   | 0.2207         | -      |     |     |     |     |     |     |
| 29292    | Conniewalker | 0.15 | 4.581  | 0.217           | 0.3674         | 0.0485       | 13.590 | 0.240 | 4.571   | 0.3097         | -      |     |     |     |     |     |     |
| 32953    | 1996 GF19    | 0.15 | 2.444  | 0.314           | 0.3897         | 0.1191       | 15.030 | 0.240 | 2.417   | 0.2942         | -      |     |     |     |     |     |     |
| 34442    | 2000 SS64    | 0.15 | 4.992  | 0.074           | 0.1006         | 0.0092       | 14.540 | 0.120 | 4.994   | 0.1082         | -      |     |     |     |     |     |     |
| 35389    | 1997 XO      | 0.15 | 4.345  | 0.000           | 0.1809         | 0.0000       | 14.690 | 0.120 | 4.291   | 0.1276         | -      |     |     |     |     |     |     |
| 36492    | 2000 QW46    | 0.15 | 3.373  | 0.039           | 0.2461         | 0.0578       | 15.045 | 0.240 | 3.324   | 0.1534         | -      |     |     |     |     |     |     |
| 40267    | 1999 GJ4     | 0.15 | 1.641  | 0.053           | 0.4530         | 0.0870       | 16.080 | 0.500 | 1.621   | 0.2487         | -      |     |     |     |     |     |     |
| 42314    | 2001 VQ121   | 0.15 | 4.531  | 0.832           | 0.1971         | 0.1531       | 14.660 | 0.120 | 4.454   | 0.1218         | -      |     |     |     |     |     |     |
| 45810    | 2000 QP32    | 0.15 | 2.304  | 0.308           | 0.4388         | 0.0831       | 15.320 | 0.240 | 2.234   | 0.2635         | -      |     |     |     |     |     |     |
| 50822    | 2000 FH35    | 0.15 | 6.744  | 0.151           | 0.0740         | 0.0232       | 14.620 | 0.120 | 6.715   | 0.0556         | -      |     |     |     |     |     |     |
| 51911    | 2001 QD68    | 0.15 | 12.304 | 0.141           | 0.0671         | 0.0145       | 13.520 | 0.120 | 12.246  | 0.0460         | -      |     |     |     |     |     |     |
| 52762    | 1998 MT24    | 0.15 | 6.742  | 0.190           | 0.0510         | 0.0090       | 14.690 | 0.000 | 6.725   | 0.0520         | -      |     |     |     |     |     |     |
| 62112    | 2000 RM99    | 0.15 | 5.331  | 0.272           | 0.2058         | 0.0328       | 13.880 | 0.120 | 5.288   | 0.1772         | -      |     |     |     |     |     |     |
| 64588    | 2001 XX3     | 0.15 | 5.477  | 0.094           | 0.1950         | 0.0276       | 14.230 | 0.240 | 5.416   | 0.1224         | -      |     |     |     |     |     |     |
| 66335    | 1999 JZ61    | 0.15 | 3.392  | 0.236           | 0.4637         | 0.0448       | 13.900 | 0.240 | 3.409   | 0.4186         | -      |     |     |     |     |     |     |
| 68905    | 2002 JZ104   | 0.15 | 1.911  | 0.472           | 0.3668         | 0.1935       | 15.860 | 0.240 | 1.868   | 0.2293         | -      |     |     |     |     |     |     |
| 71200    | 1999 XT236   | 0.15 | 6.610  | 0.146           | 0.0584         | 0.0122       | 14.885 | 0.120 | 6.589   | 0.0452         | -      |     |     |     |     |     |     |
| 74355    | 1998 WJ12    | 0.15 | 4.469  | 0.380           | 0.1537         | 0.0733       | 14.760 | 0.240 | 4.446   | 0.1115         | -      |     |     |     |     |     |     |
| 88188    | 2000 XH44    | 0.15 | 1.371  | 0.264           | 0.3740         | 0.1740       | 16.530 | 0.350 | 1.354   | 0.2356         | -      |     |     |     |     |     |     |
| 88850    | 2001 SL222   | 0.15 | 3.377  | 0.788           | 0.0676         | 0.0485       | 15.630 | 0.120 | 3.387   | 0.0862         | -      |     |     |     |     |     |     |
| 99475    | 2002 CR118   | 0.15 | 3.397  | 0.605           | 0.2916         | 0.1839       | 15.120 | 0.240 | 3.307   | 0.1446         | -      |     |     |     |     |     |     |
| 100111   | 1993 FA51    | 0.15 | 6.098  | 0.198           | 0.0571         | 0.0089       | 15.040 | 0.120 | 6.082   | 0.0460         | -      |     |     |     |     |     |     |
| 103067   | 1999 XA143   | 0.15 | 1.282  | 0.029           | 0.2460         | 0.0530       | 16.990 | 0.240 | 1.270   | 0.1751         | -      |     |     |     |     |     |     |
| 105612   | 2000 RT99    | 0.15 | 5.507  | 0.329           | 0.1604         | 0.0309       | 14.450 | 0.240 | 5.454   | 0.0985         | -      |     |     |     |     |     |     |
| 113846   | 2002 TV239   | 0.15 | 2.761  | 0.738           | 0.0638         | 0.0730       | 16.930 | 0.240 | 2.751   | 0.0395         | -      |     |     |     |     |     |     |
| 139345   | 2001 KA67    | 0.15 | 3.101  | 0.139           | 0.0380         | 0.0080       | 17.060 | 0.240 | 3.097   | 0.0276         | -      |     |     |     |     |     |     |
| 159669   | 2002 GY73    | 0.15 | 5.188  | 0.159           | 0.0498         | 0.0143       | 15.530 | 0.120 | 5.176   | 0.0405         | -      |     |     |     |     |     |     |
| 206079   | 2002 RU66    | 0.15 | 3.987  | 0.831           | 0.1218         | 0.0433       | 15.120 | 0.120 | 3.965   | 0.1006         | -      |     |     |     |     |     |     |
| 206400   | 2003 SW52    | 0.15 | 3.257  | 0.773           | 0.0418         | 0.0189       | 17.020 | 0.240 | 3.249   | 0.0260         | -      |     |     |     |     |     |     |
| 232067   | 2001 UR220   | 0.15 | 4.750  | 0.000           | 0.0655         | 0.0000       | 15.340 | 0.120 | 4.740   | 0.0575         | -      |     |     |     |     |     |     |
|          | 2005 TQ27    | 0.15 | 3.969  | 0.139           | 0.0776         | 0.0159       | 15.690 | 0.120 | 3.952   | 0.0599         | -      |     |     |     |     |     |     |

The *WISE* data were taken from [http://wise2.ipac.caltech.edu/staff/bauer/NEOWISE\\_pass1/](http://wise2.ipac.caltech.edu/staff/bauer/NEOWISE_pass1/), file *WISE\_MBA\_Pass1\_Table\_2011-09-16.txt*, and from <http://iopscience.iop.org/0004-637X/743/2/156/fulltext/>, file *apj408731t1\_mrt.txt*. For some objects that were observed at multiple epochs, they present each epoch as a separate row in their table; we use weighted means for *D* and *p<sub>V</sub>* from the multiple entries, with the weights of  $(\text{“dia\_err”})^{-2}$  and  $(\text{“pV\_err”})^{-2}$ , respectively, where “dia\_err” and “pV\_err” are their listed uncertainties for the individual entries. The *H* and *G* data were taken from Table 2. The revised diameters and albedos were made from the *WISE* estimates using the *H*, *G* data and applying the recalculation method of Harris and Harris (1997) as described in Section 4. The taxonomy data were taken from Tholen (1989), Bus and Binzel (2002), DeMeo et al. (2009), Xu et al. (1995), and Lazzaro et al. (2004), as compiled in Neese (2010); they are given in columns Taxon.(1) to (6) in the respective order (the last two columns are the data from Lazzaro et al., 2004, in the Tholen and the Bus&Binzel system, respectively). Column Taxon.(0) gives a “summary” of the taxonomic classifications; it is the union of capital letters from columns Taxon.(1) to (4) and the S/A/L classification from columns Taxon.(5) and (6).